THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Conditions persist in the iron trade under which the sale and delivery of material from the finishing mills of the country is notably restricted by an insufficient supply of steel. If the capacity of converters and open-hearth furnaces could be actually employed the firmness apparent in many finished lines would be only a matter of weeks. In another column an estimate is made of the annual output of new blast furnaces that will be ready to blow in within the next six months. It looks formidable; but actual market developments week by week show that the question is rather one of the supply of locomotives, cars and terminal trackage than of blast furnace outputs. There is undoubtedly an improvement in coke deliveries and the next two or three months are expected to show steady progress in this direction. The new West Virginia coke ovens of the Steel Corporation are starting up and Western shipments promise improvement; but against these expectations the shadow of troubles with West Virginia miners rises and makes all calculations uncertain. Furnace companies who ordinarily would be arranging for their ore supply at this time are waiting, partly because of the higher prices for Lake Superior ores, partly because the ores they bought last year will last them for several months in view of their frequent bankings, and not least because of the possibility of trouble both with furnace and coke labor. On the lakes what promised to be an early opening may be considerably delayed by the attitude of vessel labor. The whole labor situation, indeed, is the chief factor of uncertainty in the outlook for iron and steel. Mill tonnage is plentiful. There never was so heavy a business on the books of the steel manufacturers. The most significant item of the week in this regard is the inquiry for finished steel received from the leading agricultural interests of the country. A heavy tonnage in bars, agricultural shapes and plates is under negotiation. These contracts when placed will run to July 1, 1904, and will rank next to the railroad demand in importance. The increased demands upon finishing mills represented in the orders of the present month have bettered the outlook for independent producers. Work is still being done on the plan to combine the independent sheet and tin plate mills, but the question of steel supply is not easily solved. Foreign steel has been distinctly higher in the past two weeks and the domestic steel market is strong, with practically nothing offered. German basic Bessemer billets are $28.50 at New York as minimum for large lots, while deliveries cannot be had for two or three months. A further rise of $1 in German steel would add $2.24 to the duty and shut off imports. At Pittsburg Bessemer billets have been quoted at $32 and sheet bars $33 to $33.50. A Chicago sale of open-hearth billets is reported at $33. Wire rods are $36.50 to $37 Pittsburg and a gas belt sale is reported at $40. The pig iron situation is still undeveloped. Bessemer purchases for the second half are still deferred. Basic has sold at $20 at Mahoning Valley furnace for the second half. Foundry iron is rather active in the East. Sales of foreign in the New York market were 12,000 tons. Pennsylvania furnaces recently started up have made sales for the first half in the Eastern market on a basis 50 cents to $1 less than has generally ruled. In Central and Western territory there appears no change in foundry iron except that inquiries are more numerous for the second half and that the buying movement has come one week nearer.

PITTSBURG.

OFFICE OF *The Iron Trade Review*, 429 PARK BUILDING, March 25.

Consumers of both foundry and Bessemer irons continue to postpone the closing of contracts covering their requirements for the second half of the year, believing that by waiting they may be able to procure lower prices than are quoted at the present time. Furnace operators have quotations out on an immense tonnage. While a number of the Valley furnaces are holding No. 2 foundry for second half delivery at $21.85, Pittsburg, most desirable brands are now being quoted at $21.50, and it is possible that as low as $21.25 could be done on a desirable contract. On the other hand a few of the Western Pennsylvania furnaces are asking as high as $22.25, Pittsburg, and until there is more uniformity in prices the outlook is not very bright for extensive future buying. Some of the large melters of foundry iron believe that with the additional foundry iron capacity which will become available during the next six months, there will be more than sufficient iron to provide all requirements, as the annual output of these new furnaces is estimated at upwards of 900,000 tons. Such large buyers of Bessemer iron as the Cambria Steel Co., Republic Iron & Steel Co. and the United States Steel Corporation are also holding off, and they argue that the increase of pig iron production due to the blowing in of eleven furnaces that will operate on Bessemer or basic iron with an annual capacity of fully 2,000,000 tons will ease the present situation to a very large extent. All of the iron produced by the latter furnaces will, however, be consumed in the steel plants by the various concerns erecting them, so that none of this will find its way into the open market. Increased steel production will probably take care of all of the iron that is produced by these furnaces the remainder of the year, and it is doubtful if in a single instance any of the stacks will be producing at their estimated capacity before the first of next year.

For the first time in more than six months every furnace in the two Valleys is in operation and coke shipments fall only about 20 percent below the requirements of the furnaces. Weather conditions favor the rapid transportation of coke from the Connellsville region to the stacks in this district and the Valleys, and the production of iron has increased, enabling the stacks to catch up on some of their back orders.

The situation in sheets and tin plate is exceedingly strong, and if the independent mills could secure all the steel they require they would have all of their mills in operation. At the present rate of production in both these lines it is estimated that in less than six months sufficient sheets and tin plates will be produced to more than supply the demands for the remainder of this year. There is little doubt, therefore, that the majority of the mills will be compelled to shut down for extended periods this year the same as in 1902 and 1901. In the tin plate trade some

rebate business has been secured, but at the present prices of Welsh plate and the high cost of steel in this country, conditions are unfavorable to the domestic plate replacing the Welsh product in the rebate trade. Open-hearth sheets and tin bars are held at prices ranging from $33 to $33.50, Pittsburg, and at these prices, which seem inordinately high, some of the independent manufacturers are covering short time requirements. Within a month the LaBelle Iron Works, Steubenville, O., will be rolling tin bars, the mill having sufficient capacity to supply all the requirements of the Pope Tin Plate Co.; and a small tonnage will be placed on the market in addition. The Sharon Steel Hoop Co., Sharon, Pa., also expects to have its sheet bar mill in operation the latter part of April, giving the independent sheet producers another source of raw material.

Reports concerning sales of Lake Superior ores for 1903 indicate a waiting attitude by most buyers. Additional quotations are reported as follows: Princeton No. 2, $3.10; Crystal Falls, $3.50; Great Western, $3.40; Verona (silicious), $2.50; Biwabik No. 1, $3.88; Biwabik No. 2, $3.84; Cass, $3.52; Malta, $4; Steese, $4.06; Stevenson, $4.09; Wallace, $3.28.

PIG IRON.—We note the sale of 6,000 tons of basic iron for second half delivery at $20 at the furnace. Practically no Bessemer iron is being sold for this delivery, although small lots for delivery through July and August have been sold at prices ranging from $21.85 to $22.10, Pittsburg. No. 2 foundry iron for delivery in small lots for shipment to July is held at prices ranging from $22.50 to $23 and the movement is almost entirely limited to carload orders. Forge iron has been selling in small lots for early shipment at $21, but the movement has been very light. Southern forge is offered in this market at $21.50 to $21.85, but owing to the lower quotations for the Northern product is entirely unable to compete. We revise quotations as follows:

Bessemer, Valley	$21 00 to 21 50
Bessemer, Pittsburg	21 85 to 22 10
No. 1 Foundry	23 50 to 24 00
No. 2 Foundry	22 50 to 23 00
Gray Forge, Pittsburg	20 75 to 21 00
Chilled Basic, Valley	21 00 to 21 25
Chilled Basic, Pittsburg	21 85 to 22 10

STEEL.—The steel market continues to grow stronger as the demand for finished material increases, and open-hearth billets are now firm at $31.50, Pittsburg. Even at this price little steel is moving as the tonnage available is very limited. The demand for sheet and tin bars is very heavy and the ruling quotations range from $33 to $33.50. Bessemer billets, sheet and tin bars are not to be had and billets are held nominally at $30.50 to $31, Pittsburg. The foreign steel market is also growing stronger and basic Bessemer billets are now $32 to $32.50, Pittsburg, while open-hearth billets are held at $34.50. An advance of less than $1 per ton in the German market will result in an advance in the duty of $2.24, which would shut out all further importation. The recent advance in the foreign market has greatly reduced buying by Eastern concerns, although with a lower market a large tonnage would no doubt be placed. Bessemer rods are quoted at $36 to $36.50 and open-hearth at $37 to $37.50.

FERRO-MANGANESE.—Offerings continue to be limited to the English product, which is held at $50 in 50-ton lots and over, and at $55 in less than 50-ton lots, delivered at buyer's mill.

MUCK BAR.—Eastern muck iron finds ready sale in this market at $34, although the Western mills continue to ask $36 and $37 for their product on account of the increased cost of iron and labor.

SKELP.—The iron skelp market is very strong and the tonnage offered is not very large. Grooved and sheared skelp for delivery in April is held at 2.10c, while May delivery is quoted at 2.05c. Steel skelp is quoted at 1.95c to 2c. There has been some buying during the week by some of the smaller pipe mills.

SPELTER.—Prime Western grades continue to advance in price and are held at 5.45c to 5.47½c, Pittsburg, in carload lots. The market is very strong.

RAILS AND TRACK MATERIAL.—There has been little new business in rails during the week, although considerable for electric roads is pending. The demand for light rails continues fair, the bulk of the buying being done by mine operators in this vicinity. We quote as follows; Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 8 pounds in carload lots, $39; less than carload lots, $40; 12, 16 and 20 pounds, $36; 25 to 40 pounds, $36. Track materials: Spikes, 2.15c to 2.25c; track bolts, square heads, 2.05c; hexagon heads, 2.65c; fish plates, 1.60c on orders accompanying large rail contracts, otherwise 2c to 2.10c is asked.

PLATES.—The market continues exceedingly firm and all the local mills are asking from $3 to $4 a ton premium for prompt shipment. Plates for forward delivery are closed at agreed quotations which are as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.75c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive fire-box, not less than 2.10c, and it ranges in price to 3c. Plate more than 100 inches, 5c extra 100 pounds. Plate 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5c extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

BARS.—Sales of fully 1,200 tons of iron bars have been made in this district during the week, while specifications on steel bars are so heavy that all of the mills are slowly falling behind on their orders. The demand for rounds for rivet and bolt making purposes is very heavy and there is considerable buying for forward delivery. Inquiries for bars for agricultural purposes have begun and large buyers are negotiating. We quote: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer under 3 inches, 1.70c; over 3 inches, 1.80c; bar iron, 1.80c to 1.85c, Youngstown, or 1.84¾c to 1.89¾c, Pittsburg, with freight added to point of delivery from Youngstown. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots.

STRUCTURAL MATERIAL.—The strike declared against the American Bridge Co. continues to hold a large amount of work in this district tied up and little headway has been made thus far in replacing the strikers. The local mills continue to close a considerable tonnage for forward delivery with erectors all over the country, while a number of contracts for large jobs are pending. Light angles are selling at a premium, one sale of 300 tons having been made this week at 2.15c. We quote as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

PIPES AND TUBES.—The amount of new business in the large sizes of pipe continues to break all previous records and sufficient business is being offered to satisfy both the National Tube Co. and the independent mills. We revise discounts in carload lots, plus the freight to destination, as follows:

MERCHANT PIPE.

	Steel		Wrought Iron	
	Black Percent.	Galv. Percent.	Black Percent.	Galv. Percent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inch	75	65	72	62
7 to 12 inch	69	59	66	56
Plugged and Reamed				
1 to 4 inch	73	63	70	60
Cut 3 to 6 feet				
⅛, ¼ and ⅜ inch	63	52	60	49
½ inch	65	54	62	51
¾ to 6 inch	71	60	68	57
7 to 12 inch	65	53	61	50
Cut 6 feet and longer				
⅛, ¼ and ⅜ inch	64	53	61	50
½ inch	66	55	63	52
¾ to 6 inch	72	61	69	58
7 to 12 inch	66	54	62	51
Extra Strong Plain End				
⅛ to 8 inch	67	57	63	53

Threads only—Same as Plain End, plus 1¼ percent net.
Threads and Couplings—Same as Plain End, plus 2½ percent net.

Double Extra Strong Plain End				
½ to 8 inch	59	49	55	45

Threads only—Same as Plain End, plus 2 percent net.
Threads and Couplings—Same as Plain End, plus 8 percent net.

NOTE: Orders for less than carload will be charged at 12½ percent advance. Extra and Double Extra Strong Cut Lengths, lower random discounts by 10 percent net for 6 feet and longer, and 15 percent net for 5 to 6 feet.

BOILER TUBES.

Steel.

	Percent
1 to 1½ inches	45
2¼ to 5 inches	62½
1¾ to 2¼ and 6 to 13 inches	52½

Iron.

	Percent.
1 to 1½ inches	36½
2¼ to 5 inches	45½
1¾ to 2¼ and 6 to 13 inches	38½

CASING.

	S. and S. Percent.
2 to 3 inches	58
3¼ to 4 inches	60
4½ to 12½ inches	68

SHEETS.—Quotations on black sheets are being firmly maintained and sufficient business is being offered to insure the operation of all the mills for which the independents can secure a supply of steel. The American Sheet Steel Co. is also resuming operations at its idle mills and the general conditions in the trade are stronger than they have been in the past six months. The withdrawal of all concessions on galvanized sheets may be followed shortly by slightly higher prices on black sheets. We quote black sheets in 500-bundle lots and over as follows: No. 28, 2.75c; No. 27, 2.65c; No. 26, 2.55c; Nos. 22 and 24, 2.45c; Nos. 18 and 20, 2.35c; Nos. 14 and 16, 2.25c; Nos. 10 and 12, 2.10c to 2.15c. Galvanized: No. 16, 2.60c; No. 18, 2.85c; No. 26, 3.35c; No. 27, 3.60c; No. 28, 3.85c; No. 29, 4.35c; No. 30, 4.50c.

WIRE AND WIRE NAILS.—Demand continues exceedingly strong and one of the large local independent wire nail mills continues to secure 5 cents a keg above the quotations of the American Steel & Wire Co. It is probable that the cut nail manufacturers will shortly advance prices slightly. We quote: Wire nails, carload lots, to jobbers, f. o. b. cars, Pittsburg, $2.00; plain wire, carload lots, $1.90; barb wire carload lots, $2.30; staples, carload lots, $2.20. Galvanizing, 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel cut nails are quoted as follows: Carload lots, $2.10, and less than carload lots, $2.15 f. o. b. Pittsburg, plus freight to point of destination. Iron cut nails are $2.20 in carload lots and $2.25 in less than carload lots. Terms, 60 days, less 2 percent off in 10 days.

MERCHANT STEEL.—On some of the lower grades of tool steel prices have recently been sharply reduced and the competition between several of the larger manufacturers is very keen. The higher grades according to brand have not changed in price. We quote as follows: Turned cold rolled and ground shafting, 47 off in carload lots and 42 percent off in less than carload lots; tire steel, 2.15c to 2.25c; spring steel, 2.25c to 2.35c; toe calk, 2.30c to 2.40c. The following differentials maintain: Less than 2,000 pounds of a size and not less than 1,000 pounds 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Tool steel is quoted 7 cents and upwards, according to the grade.

OLD MATERIAL.—A much larger tonnage of cast scrap is coming into this market than for some time and the offerings are now being made at prices ranging from $18.50 to $19. Heavy melting stock is held at $21.50 to $22 and a shortage still exists. Our quotations, gross tons, are as follows: Heavy melting stock, $21 to $21.50; low phosphorus melting stock, $25 to $25.50; steel rails, $21 to $21.25; re-rolling rails, $22.50 to $23; No. 1 cast scrap, $19.50 to $20; borings, $11 to $11.50; busheling scrap, $17.50 to $18.50; old iron rails, $24.50 to $25; turnings, $15 to $15.50.

COKE.—Further contracts for furnace coke for second half delivery have been closed at prices ranging from $3.75 to $4, but furnace operators in the East are not closing all their requirements at these quotations, believing that lower prices will prevail during the next two months. Furnace coke for early delivery is held at $5 to $5.50 at the ovens and foundry at $6 to $6.50. For the week ending Saturday, March 14, the production of the upper region amounted to 246,126 tons and that of the lower region 50,600 tons.

The offices of Howard M. Hooker & Co., dealers in pig iron and coke, have been removed from 321 Park Building to 1718 Farmers' Bank Building.

The offices of Rogers, Brown & Co., Pittsburg, will be removed from the Park Building to Rooms 2008 and 2009 Farmers' Bank Building on April 1.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, March 24.

The local market shows no material change from last week, its activity still being confined largely to finished iron and steel. Pig iron is in demand only in small lots and for immediate shipment. A few small melters covered for their requirements for the last half, but the total of these sales is not large enough to cause comment. There are several large inquiries pending, principally for basic, malleable Bessemer and charcoal irons, but it is doubtful if any of these will be placed for several weeks. Demand for all light finished products has been very heavy, and new business in plates, structural steel, rails, etc., is limited only by the capacity of mills to turn out the material. Manufacturers of agricultural implements are sounding the market preparatory to placing contracts for their needs for the year ending July, 1904, and a large tonnage is expected from this quarter in the near future. Sheets are firm and buying is brisk, a local dealer having recently advanced its mill quotations on galvanized $6 a ton. A marked impetus is also noted in the sales of merchant pipe and boiler tubes, and store prices of the latter will shortly be advanced. The buying of bar iron and steel is of a satisfactory volume and has justified the starting up of a local mill that has been idle for several months. Foreign billets have advanced on account of the increased activity of German markets. We note the sale of a small lot of wire rods in the gas belt region at $40 per ton and of 3,000 tons of domestic open-hearth billets at $33 a ton. Buying of scrap iron during the week has been heavy, rolling mills being the principal purchasers. The stringency in the fuel market has eased to some extent as a result of traffic improvements, and sales of Connellsville coke are now being made on the basis of $8.65 Chicago.

PIG IRON.—Fifteen to twenty thousand tons of basic iron have been sold in this and other Western markets in the past two weeks, and a nearly equal quantity is still pending. Sales were made on the basis of $18, Birmingham, deliveries to commence in the second quarter and extending through to the end of the year. Inquiries have also been made for several thousand tons of charcoal iron, and about 2,000 tons of malleable Bessemer, the bulk of which is for delivery in the last half. Demand for gray forge and Nos. 3 and 4 foundry has also been good, including one lot of 3,000 tons of No. 4 and another lot of 2,000 tons of gray forge. The buying of foundry grades is limited almost entirely to small lots for quick shipment, for which there is a good demand. A few foundrymen have covered for their requirements for the last six months of the year, but the total is not large. There is yet no movement apparent among foundrymen to purchase for a period beyond June 30. Inquiries are numerous enough, but they are invariably withdrawn as soon as quoted upon. The market maintains its strength, however, and the frequent orders for small lots for quick shipment indicate not only a large consumption, but a condition of low stocks all over the country. The car embargo has been lifted to some extent in the past week, and both coke and pig iron have been received in larger quantities. We quote as follows, the maximum price being asked for deliveries prior to July 1:

Lake Superior Charcoal	$26 50 to 27 50
Local Coke Foundry No. 1	23 50 to 24 50
Local Coke Foundry No. 2	23 00 to 24 00
Local Coke Foundry No. 3	22 50 to 23 50
Local Scotch Foundry No. 1	24 00 to 24 50
Southern Coke No. 1	22 85 to 23 35
Southern Coke No. 2	22 35 to 22 85
Southern Coke No. 3	21 85 to 22 35
Southern Coke No. 4	21 35 to 21 85
Southern No. 1, soft	22 85 to 23 35
Southern No. 2 soft	22 35 to 22 85
Southern Gray Forge	21 35 to 21 85
Southern Silveries (according to silicon)	26 15 to 27 15
Jackson Co. Silveries, 6 to 8 percent silicon	21 30 to 22 30
Ohio Strong Softeners	26 30 to 26 80
Alabama and Georgia Car Wheel	27 35 to 28 35
Malleable Bessemer	23 00 to 24 00
Standard Bessemer	23 30 to 24 30
Basic Iron	22 35 to 22 85

BARS.—There is a good demand for both iron and steel in small lots, for which quick shipment is asked. Specifications are particularly brisk, one mill reporting a very heavy ton-

nage on old contracts during the week under review. Hoops are quiet, the spring trade not opening for a few weeks. Angles are in good demand and deliveries on new business uncertain. A number of small consumers in outlying districts are sounding the market with the view to placing contracts for their requirements for the year ending July, 1904. The Emlyn Iron Works are getting their plant at East Chicago in shape preparatory to starting up again. This mill has been idle for three or four months. Prices are firm without change. We quote mill shipments, Chicago delivery, as follows: Bessemer steel, 1.76½c; angles, less than 3x3, 1.86½c base; hoops, in lots of 250 tons and greater, 2.06½c; less than this amount, 2.16½c; iron, 1.85c to 1.90c. Store prices are as follows: Steel, 2c to 2.10c; iron, 2.15c to 2.20c; hoops, 2.40c to 2.50c; angles, 2.25c rates.

Sheets.—There has been an active demand for both black and galvanized sheets of all gauges, and a large tonnage has been booked. Mills and dealers are sold well ahead, and few can deliver material within 30 days. Prices on galvanized have advanced during the week, some mills asking $2 a ton over last week's quotations, and a local dealer $6 a ton. Black sheets are very firm. We quote mill shipments, carload lots, Chicago delivery: Black sheets, No. 27, 2.91½c; No. 28, 3.01½c. Galvanized, No. 27, 3.70c to 3.90c; No. 28, 3.80c to 4.10c. On lots from store we quote: Black No. 27, 3c to 3.10c; No. 28, 3.10c to 3.20c. Galvanized 75 percent.

Structural Steel.—The week has been quiet so far as new business is concerned, though specifications have been numerous and calling for a good-sized tonnage. The contract for a building requiring 700 tons of shapes was let during the week, and figures are being taken for a building to be erected in Cincinnati which will consume about 1,500 tons of steel. One mill has withdrawn from the market on certain sizes of material. Store trade has been very active. We quote mill prices, Chicago delivery: Beams and channels, 15 inches and under, 1.75c to 2c; 18 inches and over, 1.85c to 2.10c; universal plates, 1.75c to 2.10c; angles, 3x3 and larger, 1.75c to 2c; tees, 3x3 and larger, 1.80c to 1.90c; zees, 1.75c to 1.95c. The maximum quotation is asked by some mills and dealers on lots for quick delivery. Material from store, cut to length, is quoted at 2¼c to 2½c per pound.

Plates.—Mills and dealers able to give quick deliveries are in receipt of a large number of orders, aggregating several thousand tons. Premiums of $2 to $3 a ton over base prices are easily obtained for prompt shipment. The movement from warehouse stocks has been correspondingly brisk. We quote mill shipments, Chicago delivery, as follows: Tank steel, ¼-inch and heavier, 1.75c to 1.90c; flange steel, 1.85c to 2.05c. Prices for lots from stock, tank steel, ¼-inch and heavier, 2.15c to 2.25c; 3-16, 2.25c to 2.35c; No. 8, 2.30c to 2.40c; No. 10, 2.35c to 2.45c; flange steel, 2.40c to 2.50c.

Rails and Track Supplies.—Actual sales do not represent a large tonnage, though several good-sized orders are still pending. The demand for track supplies continues without diminution. We quote standard sections, 500 tons and over, $28; less than 500 tons to carlots, $30; less than carload lots, $32; light rails, 45 pounds, $34 to $35; 12 pounds, $40 to $41, with regular differentials for intermediate sizes. Track supplies, mill shipments: Angle bars, 2c to 2.10c; spikes, first quality, 2.25c (out of store, carload lots, 2.35c to 2.45c rates); second quality, 2.15c; track bolts, 3½x¾, with square nuts, 2.85c to 3c per 100 pounds; with hexagon nuts, 3.05c to 3.15c, with usual differentials for other sizes.

Merchant Steel.—Inquiries are being received from manufacturers of agricultural implements who are seeking to place contracts for their requirements for the year ending July, 1904. Actual transactions in new business have not been large, though specifications are still being received in good volume. We quote mill shipments, Chicago delivery, as follows: Spring steel, 2.65c to 2.75c; sleigh shoe, 1.95c flat sizes; concave and convex, 2c; out of store 2.15c; cutter shoe, 2.50c to 2.60c; machinery steel, 2.15c to 2.25c base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.30c to 2.40c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; specials 13c and upwards; less than carload lots 5 to 10 percent higher; cold rolled shafting, carload lots, 47 percent off; less than carload lots, 42 percent off.

Merchant Pipe.—Mills report the volume of business closed as being very satisfactory, a number of big jobbers and consumers having covered for their wants during the week. Shipments from mills are improving, and material en route is not subjected to the delays that were so frequent and annoying several weeks ago. We quote on carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ to ⅜ in inclusive	66.35	56.35	63.35	53.35
½ inch	68.35	58.35	65.35	55.35
7 to 12 inches, inclusive	67.35	57.35	64.35	54.35

Less than carload lots, 12½ percent advance over above prices.

Boiler Tubes.—A good business has been transacted, and jobbers contemplate advancing their prices on lots from stock. We quote prices on carload lots, mill shipments, f. o. b. Chicago. On less than carload lots from mill, 12½ percent is to be added:

	L. W. Steel Percent.	C. C. Iron Percent.
1 to 1½ in	43.35	38.35
1¾ to 2½ in	55.85	35.85
2¾ to 5 in	60.85	45.85
6 to 13 in	55.85	35.85

For lots direct from warehouse stock:

	L. W. Steel Percent.	C. C. Iron Percent.
1 to 1½ in	40	35
1¾ to 2½ in	50	32½
2¾ to 5 in	57½	42½
6 to 13 in	50	32½

Cast Iron Pipe.—There is little demand for cast pipe and business closed is of small proportions. The present dullness of the market is attributed to the high prices asked for material. We quote f. o. b. Chicago, 4-inch water-pipe, $34; 6-inch, $33; 8-inch and upwards, $32; gas pipe, $1 a ton higher.

Billets and Wire Rods.—We note the sale of 200 tons of wire rods in the gas belt region at $40; of 3,000 tons of domestic open-hearth billets for use in rolling mills, at $33; of 250 tons of open-hearth billets for forging purposes at $36. The last sale of domestic Bessemer billets in this market was made at $30.50, but this price could not be duplicated at the present time. Foreign billets have advanced, due to the increased activity of trans-ocean markets. German basic Bessemer billets, Chicago delivery, are quoted at $32.50. Special carbons are higher.

Wire Nails and Fencing.—No cessation is to be observed in the extremely active demand for all kinds of wire products. A strong cry has gone up from dealers all over the west for immediate shipment of material, stocks in warehouses being very low. Local manufacturers are at least a month behind in shipments. We quote prices to jobbers, Chicago delivery, as follows: Wire nails, carload lots, $2.20; less than carload lots, $2.30. Cut nails, steel, carload lots, $2.26½; less than carload lots, $2.36½. Plain wire, $2.10 carloads, and $2.20 in smaller lots; galvanized, carloads, $2.40; smaller lots, $2.50. Barbed wire, carloads, $2.50; less than carloads, $2.60; galvanized, carloads, $2.80; less than carloads, $2.90. Staples, carloads, $2.30; smaller lots, $2.40; galvanized, carloads, $2.60; smaller lots, $2.70. Bale ties, 85 percent discount f. o. b. Waukegan on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or DeKalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Coke.—The coke market has loosened up slightly and shipments are being made with greater regularity than heretofore. Connellsville is now quoted at $6 at the ovens—$8.65 Chicago. Southern coke is offered at $8.50 to $9 Chicago.

Old Material.—The market has strengthened considerably during the past week, due to the large purchases of several rolling mills. Cast scrap is scarce and advancing, foundries being active buyers of same. We quote gross tons as follows:

Old iron rails	$23 50 to 24 00
Old steel rails (mixed lengths)	18 00 to 18 50
Old steel rails (long lengths)	21 50 to 22 00
Relaying rails	31 50 to 32 00
Old wheels	23 00 to 23 50
Heavy melting steel	17 00 to 17 50
Mixed country steel	15 00 to 15 50

The following are selling prices per net ton:

No. 1 R. R. wrought	$19 50 to 20 00
No. 2 R. R. wrought	18 00 to 18 50
Shafting	19 00 to 19 50
Dealers' forge No. 1	16 50 to 17 00

No. 1 busheling and wrought pipe	14 00 to 14 50
No. 1 cast	17 00 to 17 50
Railway malleable	15 50 to 16 00
Country malleable	14 50 to 15 00
Iron axles	23 50 to 24 00
Steel axles	19 50 to 20 00
Cast borings	10 00 to 10 50
Mixed borings, etc.	9 50 to 10 00
Wrought turnings	13 50 to 14 00
Machine shop turnings	13 50 to 14 00
Iron axle turnings	14 00 to 14 50
Steel axle turnings	13 50 to 14 00
Stove plate and light cast scrap	13 00 to 13 50
Old iron splice bars	21 00 to 21 50

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, March 25.

Weather conditions are favorable for the opening of navigation next week, but labor controversies may prevent vessels from starting. Conferences of dock managers and longshoremen have continued during the week and are still in progress. Minor differences have been adjusted and the prospect is that this week will see a settlement of the questions relating to wages and hours. The Lake Carriers' Association has more difficult problems to solve in conferences with representatives of the unions of tugmen, masters and pilots. The American Association of Masters and Pilots has ordered all its members not to report for duty until a settlement shall be reached with the Lake Carriers' Association, the controversy being over a proposition made by the Pittsburg Steamship Co. which the union refused to accept. This company expected to start about 100 vessels next week, but the refusal of masters and pilots to work may cause indefinite delay. Independent vesselmen would welcome a delay in the beginning of shipments of ore and it will not be surprising if controversies over labor questions, which under other conditions might be quickly adjusted, will be prolonged. The vesselmen realize that the early opening of navigation would not help them in getting the freight rates which they insist they must have unless the vessels are to be run at a loss. Pending the settlement of these labor questions, there is little discussion about freights and navigation may open without any contracts being made.

IRON ORE.—Sales are being made very slowly. Many furnaces using Bessemer ores have stocks in yards or on docks which will meet their requirements until late in the summer and this fact, together with the failure of large consumers of Bessemer iron to buy for the second half, accounts for the hesitation in buying probably more than the advance in prices. There has been, however, some discussion among furnacemen who use both Bessemer and non-Bessemer ores about the possibility of getting better prices than those quoted them. A meeting of furnacemen has been held in Southern Ohio at which this matter was considered. This meeting was called principally to consider labor questions and the discussion of ore prices was incidental. The report that the furnacemen were arranging to purchase ore lands and mines is not taken very seriously. The prospect of extensive strikes of coal miners in the Virginias has had its influence in causing furnacemen to hesitate about purchasing ore, for, if the coke situation, which is already far from favorable, should be complicated by strikes, many furnaces would be compelled to go out of blast.

PIG IRON.—There has been a marked increase in the number of inquiries for foundry iron for the last half and traveling men have been kept busy seeing prospective customers who have sent in inquiries. This new interest gives the sellers hope that the long period of small sales is nearing its end, but as yet no large transactions can be recorded. This is no change in prices. Basic is selling at $20 Valley furnace for the second half, and for No. 2 foundry $21 is the usual price asked at the furnace, except for Southern Ohio, which commands $22. We quote as follows, f. o. b. Cleveland, for shipments in the first half of 1903:

Bessemer	$21 85 to 22 35
No. 1 Strong Foundry	23 00 to 23 50
No. 2 Strong Foundry	22 50 to 23 00
No. 3 Foundry	21 75 to 22 25
Scotch No. 1	22 75 to 23 00
Scotch No. 2	22 25 to 22 50
Gray Forge, Valley	20 00 to 20 25
Lake Superior charcoal	26 50 to 27 50

FINISHED MATERIAL.—The effort to sell bar iron is now subordinated by activity in the steel bar market. One large producer of bar iron still quotes 1.85c, Youngstown, but makes few sales. Others are selling in moderate quantities at 1.80c, Youngstown, and reports of lower quotations are still heard. On the whole, the market is firm but quiet. The prices of steel bars, 1.60c for Bessemer and 1.70c for open hearth, Pittsburg, are adhered to in spite of lively competition to get orders of large agricultural interests which have just come into the market. Some of the smaller manufacturers of agricultural implements have already placed their orders for the year ending July, 1904. Agreement quotations on structural material are as follows: Beams and channels, 3 to 15 inches, 1.70c; 18 to 24 inches, 1.80c; tees, 1.75c; zees, 1.70c; angles from 3 to 6 inches, 1.70c; universal plates, 1.70c. Premiums for prompt delivery of structural material are not so large and the demand is not so strong as it was at this time last year. The demand for sheets is stronger, but the independent mills are still cutting and with competition as strong as it is, it is difficult to see how anticipated advances can be made. As announced last week, certain concessions to jobbers have been withdrawn, but jobbers have not advanced prices and it is not probable that they will be able to do so. The announced prices of the principal producer for sales through jobbers are as follows: Galvanized sheets, mill sales, carload lots, Nos. 10 and 11, 2.60c; Nos. 12-14, 2.70c; Nos. 18 to 21, 3c; Nos. 22 to 24, 3.20c; Nos. 25 and 26, 3.55c; No. 27, 3.80c; No. 28, 4.05c; No. 29, 4.45c; No. 30, 4.95c. Galvanized sheets out of stock are quoted 75, 10 and 2½ off. For 3-16-inch black sheets and heavier we quote 2.15c, Cleveland. Mill sales of black sheets to consumers are made on the following basis: No. 24, 2.65c to 2.75c; No. 26, 2.75c to 2.85c; No. 27, 2.85c to 2.95c. The following are prices out of stock: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.50c to 2.60c; No. 16, 2.55c to 2.70c; Nos. 18-20, 2.75c to 2.90c; Nos. 22-24, 2.85c to 3c; Nos. 25-26, 2.95c to 3.10c; No. 27, 3.05c to 3.20c; No. 28, 3.15c to 3.30c.

OLD MATERIAL.—There has been a sharp advance in the price of heavy steel and malleable railroad iron, that on the former being $1 and on the latter 50 cents. Old steel rails, 6 feet and under, have also advanced 50 cents. The market in general is strong. We quote f. o. b. Cleveland, gross tons:

Old iron rails	$25 00 to 26 00
Old steel rails (over 6 feet)	22 00 to 23 00
Old steel rails (6 feet and under)	20 50 to 21 00
Old car wheels	24 50 to 25 00
No. 1 R. R. wrought scrap	22 00 to 22 50
Mill scrap	19 00 to 19 50
No. 1 machine cast scrap	21 00 to 21 50
Iron axles	29 00 to 30 00
Steel axles	28 00 to 29 00
Axle turnings	18 00 to 19 00
Wrought turnings (free from cast)	16 00 to 17 00
Cast borings	11 00 to 11 50
Uncut wrought iron boilers	12 00 to 13 00
Steel boiler plates	18 00 to 19 00
Grate bars	13 00 to 14 00
Pipes and flues (clean)	17 50 to 18 50
Tank iron	17 00 to 18 00
Hoop and band iron	13 50 to 14 50
Sheet iron	12 00 to 13 00
Wrought drillings	15 50 to 16 50
Malleable iron (railroad)	19 50 to 20 00
Malleable iron (agricultural)	17 50 to 18 00
Stove plate	16 00 to 17 00
Heavy steel	20 00 to 21 00

CINCINNATI.

March 24.

Coke is becoming slightly easier and some improvement in transportation is noticeable. Deliveries on pig iron on contracts are also coming forward on better time. There is some revision of prices on finished materials, notably merchant pipe, boiler tubes and galvanized sheets. Labor troubles, or rather the apprehension of difficulty with the mine workers' union in the Pocahontas and New River regions, are creating some uneasiness among the furnaces depending upon these fields for their coke supply.

PIG IRON.—There is no change in prices and for another week the waiting situation has been prolonged. Buyers still show no inclination to purchase for the second half of the year, but a more hopeful feeling pervades the market and the maintenance of prices is encouraged by the apparent interest which buyers are now taking in the situation. Inquiries have been made by buyers, of traveling men, and by letters to sales agents calling for opinions and, in some cases, quotations for the second half. While this has resulted in practically no business it furnishes an indication that buyers are informing themselves and showing more disposition to become interested. Scattering sales of prompt shipment iron have also been a

little more numerous and the $18 Birmingham basis for No. 2 foundry is the prevailing price. The gray forge market is quiet, with but little inquiry and not much trading. Among sales agents it seems to be the opinion that the long delayed buying movement should make its appearance about the middle of May, if not sooner. The appearance of the market today shows nothing in favor of lower values except the lack of demand, but this has not yet succeeded in breaking the market. We quote for early delivery f. o. b. Cincinnati:

Southern Foundry No. 1	$22 00 to 22 50
Southern Foundry No. 2	21 25 to 21 50
Southern Foundry No. 3	20 75 to 21 25
Southern Foundry No. 4	19 75 to 20 75
Southern Foundry No. 1, soft	22 00 to 22 50
Southern Foundry No. 2, soft	21 25 to 21 75
Gray Forge	18 75 to 19 25
Northern Foundry No. 1	24 15 to 24 65
Northern Foundry No. 2	23 15 to 23 65
Southern car wheel iron	27 75 to 28 75

FINISHED MATERIAL.—The demand continues good for all descriptions and prices are well maintained. The advance in galvanized sheets has not yet been made public, but buyers have been informed that prices will be quoted only upon application and statement of specifications. The former discounts are therefore without value and quotations are omitted until conditions become better established. We quote today black sheets No. 27 at 2.78c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 3.10c; No. 27, 3.20c; No. 16, 2.70c; No. 14, 2.60c; No. 12, 2.50c; No. 10, 2.40c. Tank plates are firm and sell out of store at 2.25c for ¼-inch and 2.35c for 3-16-inch. Beams and channels are quoted at 2¼ to 2¼c from stock, and angles at 2.15c to 2.25c for base sizes. Merchant pipe is firm with all quotations advanced, more particularly sizes 7 to 12 inches inclusive. Boiler tubes are also firm and higher. We quote:

MERCHANT PIPE.

(Basing Discounts.)

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent	Black. Percent.	Galv. Percent.
⅛, ¼, ⅜-inch	66.7	56.7	63.7	53.7
½-inch	68.7	58.7	65.7	55.7
¾ to 6-inch, inclusive	73.7	63.7	70.7	60.7
7 to 12-inch, inclusive	67.7	57.7	64.7	54.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1½-inch	41.2	35.2
1¾ to 2½-inch	54.2	34.2
2¾ to 5-inch	59.7	44.2
6 to 13-inch	54.2	34.2

OLD MATERIAL.—Prices are well sustained and the market is quiet but firm. We quote:

Old No. 1 wrought railroad, net tons	$18 50 to 19 00
Cast machine and foundry, net tons	17 00 to 17 50
Old iron rails, gross tons	22 50 to 23 00
Old steel rails, gross tons	21 50 to 22 00
Old short lengths, gross tons	17 50 to 18 00
Old iron axles, net tons	27 00 to 27 50
Old chilled car wheels, gross tons	22 00 to 22 50
Stove plate, net tons	11 50 to 12 00
Wrought turnings, net tons	15 50 to 15 75
Cast borings, net tons	12 00 to 12 50

NEW YORK.

OFFICE OF *The Iron Trade Review*,
Room 1909, No. 150 NASSAU ST., March 24.

PIG IRON.—The situation in this market during the past week was a repetition of the week previous, foreign irons again showing most of the activity that was noticeable. German brands were conspicuous alike for actual trades made and for inquiries for future delivery. At least 12,000 tons changed hands during the week, at prices ranging from $20.50 to $21, New York delivery, duty paid. Representatives of German furnaces report some inquiries for the last half, but no sales have been made, and none are in prospect, so far as the immediate future is concerned. Buyers are said to be very insistent about early delivery, but find it difficult, if not impossible, to have shipments made until before six weeks at the earliest, while there are some furnaces which cannot deliver short of May and June. English brands are in good demand, but a decided stiffening in prices is noted, of which American consumers, it is said, have not taken cognizance. As a result the sales made are so few as to be altogether out of proportion to the tonnage inquiries represented. Middlesboro No. 3 in large lots, this delivery, duty paid, is held at a shade under $19 at the lowest. Not in months have we quoted this grade at such a high figure. Scotch irons are only in fair demand, and transactions closed form an insignificant tonnage. The pig iron industry in Continental Europe, according to all reports, is now in a more prosperous condition than in many months. Domestic irons show some soft spots due to offerings of furnaces in Eastern Pennsylvania that have recently started up. The course of the leading interest relative to purchasers from the merchant furnaces for the second half is expected to exert an influence on general buying for that delivery. We quote: No. 1 X Northern, $23.25 to $24.25; No. 2 X, $22 to $22.75; No. 2 plain, $21 to $21.75; Southern No. 1 foundry, $23 to $23.50; No. 2 foundry, $20 to $22.50; No. 3 foundry, $21.50 to $22; No. 4 foundry, $20.50 to $21.

BILLETS.—German billets continue in good demand, and prices are extremely firm. Deliveries are getting more at variance with buyers' wishes, and there are some importers who will not promise shipment before June. Bessemer basic billets, in large lots, New York delivery, duty paid, rule at $28.50 to $29.25, and open-hearth billets at $29.50 to $30.25.

FINISHED IRON AND STEEL.—The Pacific Coast has figured quite largely in the structural material market during the past week. The American Bridge Co. reports more inquiries from that territory, and closing more contracts for it, than at any time since the company was formed. It turned down two orders aggregating 2,500 tons, because delivery could not be made as desired. The most notable order booked was for 4,500 tons for the Merchants Exchange Building, San Francisco. The company's labor difficulties continue to hamper its operations, but not so acutely as before. The situation is expected to improve greatly in the near future. Sheets developed more strength during the week, and so urgent have been the requests for immediate delivery that some buyers have been known to pay a slight premium. Galvanized sheets are in particularly good demand. In plates the influx of orders is more marked and mills meeting buyers' expectations as to delivery obtain handsome premiums. In bars business is satisfactory and the outlook most favorable. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 2.10c to 2.15c; flange, 2.25c to 2.30c; fire box, 2.30c to 2.50c; refined iron bars, 1.95c to 2.10c; soft steel bars, 1.95c to 2.10c; steel sheets, in carloads, New York, No. 28 black, 3.10c to 3.15c; galvanized, 75 and 2½ off.

PHILADELPHIA.

March 24

There are some irregularities in the market, which in most respects is strong. Inquiries are numerous in nearly all lines and sales are of fair size. The warm weather has been favorable for the railroads and as coal and coke are more promptly delivered, there is now less restriction of production.

PIG IRON.—Indications are that there will now be increased activity, but the hopes of furnacemen have not yet been realized to any great extent. Foreign markets are higher. The local market is steady and firm without special feature. A meeting of Southern interests will be held early in April and the action taken at that time will be of considerable importance. Mills are using more forge iron. Basic and Bessemer are quiet. For shipments during the second quarter we quote as follows, while for shipments for the entire year somewhat lower figures could be quoted: No. 1 X foundry, $23.50 to $24; No. 2 X foundry, $22 to $22.50; No. 2 plain, $21.50 to $22; gray forge, $19.50 to $20.50; Middlesboro No. 3, $21 to $21.50; Scotch, $22.50 to $23.50; basic, $19.75 to $20.50.

BILLETS.—Steel is hard to get for prompt delivery. American soft billets are selling at $31 to $32 and German at $27.75 to $28.25.

FINISHED MATERIAL.—There is a strong demand for common iron for car building requirements. A fair business has been done recently in heavy sheets and reports from sheet mills are generally favorable. The business in skelp is lively. Pipe of all kinds is strong, but orders are not very large. A great deal of new mileage is now in condition for contracts for steel rails. It is understood that a considerable tonnage will be purchased abroad. We quote as follows: Plates, in small lots, 2.10c to 2.15c; carload lots, ¼-inch and thicker, 1.97½c to 2c; universals, 2c; flange, 2.10c to 2.20c; firebox, 2.25c to 2.30c; marine, 2.30c to 2.35c. Steel bars,

1.80c to 1.90c; prompt shipments from local mills, Western steel, 1.75c to 1.80c; bar iron, 1.93½c to 1.98½c for carload lots as minimum quantity. Structural material in small sizes, 1.73½c to 1.80c; large sizes, 1.90c to 2.10c.

OLD MATERIAL.—Scrap of all kinds is scarce and prices are higher. We quote as follows: Old steel rails, $21.50 to $22; miscellaneous heavy steel scrap, $21 to $21.50; low phosphorus scrap, $26.50 to $27.50; old steel axles, $27 to $28; old iron axles, $30 to $31; old iron rails, $25 to $26; old car wheels, $24.50 to $25.50; choice scrap RR. No. 1 wrought, $23.50 to $24; country scrap, $20.50 to $21.50; machinery cast, $19.50 to $20.50; No. 2 light scrap (forge), $17.50 to $18; No. 2 light scrap (ordinary), $14 to $15; wrought turnings, $16.25 to $16.50; wrought turnings, choice heavy, $16.75 to $17.25; cast borings, $11 to $11.50; stove plate, $16 to $17.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM NO. 1909, 150 NASSAU ST. March 24.

PIG TIN.—Daily cables from London showing lower prices had a depressing effect on the market here, and as a result values are considerably easier. Business here is of the slowest order, and this puts a damper on every attempt to advance prices. In London this forms a disappointing feature, and bearish interests have made good use of it in their operations. Closing prices today at the Metal Exchange were as follows: Spot to June, 29 to 29½c. London's closings follow: Spot, £134 10s; futures, £134 15s. Arrivals at Atlantic ports for the month to date amount to 3,293 tons, with 5,204 afloat.

COPPER.—While prices do not show any great deviation from those quoted in our last report, the undertone of the market is not as strong as it was then. Consumers gave additional evidence during the week of their determination not to buy in large quantities, and the buying done was more strictly of the hand to mouth variety than at any time since the upward movement in prices began. The London market declined rather sharply from the highest figures, and only a moderate business was transacted. Closing prices at the Metal Exchange today, largely nominal, were as follows: Lake, 14¾ to 15c; electrolytic and casting, 14½ to 15c; standard, 14c. London closed today as follows: Spot, £65 2s 6d; futures, £64 17s 6d. Exports for the month to date aggregate 8,500 tons, against 14,323 tons for a similar period a year ago.

LEAD.—Lots of 50 tons or more sell at 4.67½c. St. Louis is a little stronger at 4.60c. London is weaker at £13 5s.

SPELTER.—An exceptionally strong market has prevailed, and the price here after reaching 5.75c declined to 5.65c, at which it now remains. St. Louis advanced 10 points to 5.35c. London is higher at £23, although selling at one time during the week at £24.

ANTIMONY.—Is unchanged. Cookson's is 8¼c to 8½c; Hallett's, 6¾c to 6⅞c; and other brands, 6⅝c to 6¾c.

NICKEL.—Large lots can be had at from 40c to 50c, and smaller lots at from 50c to 60c.

QUICKSILVER.—Jobbers only are in the market, and sales have been made on the basis of $48 per flask in lots of 100 flasks. London, £8 15s.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, March 24.

The demand for copper is unabated, and consumers have been placing orders freely. Pig tin is firm, and both pig lead and spelter have advanced. The demand for all metals is very brisk. We quote lake copper, carload lots, 15c; smaller quantities, 15¼. Pig lead, 4.50c in 50-ton lots, and 4.62c in carload lots. Pig tin, 33c. Spelter, 5½c carload lots, and 5¾c for lesser quantities. Sheet zinc, 6¼c to 6½c for lots over 600 pounds. Antimony, 10¾c to 11c for Cookson's, and 9¾c for Hallett's in small quantities. Old metals are also strong. We quote, copper wire, $13; heavy copper, $12.50; light copper, $12; red brass, $11.50; yellow brass, $10; light brass, $8.50; lead pipe, $4.10 zinc, $4.10.

The William Tod Co., of Youngstown, O., has been awarded the contract for two blowing engines for the new blast furnace to be erected by the National Steel Co. at Youngstown, O.

TRADE PUBLICATIONS.

The subject of fan motors is interestingly handled in a small pamphlet prepared by the Westinghouse Electric & Mfg. Co., of Pittsburg. These motors are made for service on alternating as well as direct current circuits and are of both swivel and trunnion type.

The Western Malleable & Grey Iron Mfg. Co., of Milwaukee, Wis., has a blotter illustrative of the "Perfection" chair iron, which has ball bearings and other special features. The descriptive catalogue is sent on request.

The C. W. Hunt Co., of West New Brighton, Staten Island, N. Y., describes an electric storage battery locomotive in catalogue 0223. This machine is manufactured either to standard gauge or to a 21½-inch track; the former size will switch two or more freight cars at a time and the smaller gauge locomotive is specially adapted to run on curves of 12 feet radius in buildings and yards of manufactories.

Blotters relative to narrow gauge railway material are being mailed by Arthur Koppel, of 66 Broad St., New York.

The line of universal milling machines is treated at length in a recent catalogue issued by the Garvin Machine Co., of New York. This catalogue is a revision of No. 1 and bears that number with of course the present date. Several features of general adoption are mentioned as having been originally introduced by this company and modern practice in milling machine construction is illustrated with many detail illustrations.

The Dodge Mfg. Co., of Toronto, Can., has a new catalogue of its general line of power transmitting machinery and grain handling appliances. The extent of the business is suggested by the size of the catalogue, which comprises 311 pages of standard dimensions.

The catalogue of the Kilgore Machine Co., of Minneapolis, Minn., is devoted to quick acting saw mill cranes and carriage cushions, logging car stakes and log loaders, steam shovels, excavators and ditchers.

The catalogue of the New York Blower Co., of Bucyrus, O., is a very fine specimen of the reproductive art as well as a choice example of typography. The present issue, No. 26, is devoted to heating and ventilation and the 86 7½x9 pages are not only illustrative of the products of the company but contain a number of useful tables and diagrams on matters germane to this branch of engineering.

Personal.

Chas. E. Stamp, of Chas. E. Stamp & Co., 602 New England building, Cleveland, has returned from an extended Cuban trip connected with the investigation of iron ore property.

Charles M. Schwab, president of the United States Steel Corporation, accompanied by Mrs. Schwab, arrived in Pittsburg last week for a brief stay, returning to New York on Monday morning. It is probable that Mr. Schwab will go to Pittsburg later for a longer visit.

The resignation of Clarence Price, for five years purchasing agent for the Chicago & Alton, is announced to take effect April 1. He has been appointed New York agent for the American Car & Foundry Co.

Robert J. Gross, second vice president of the American Locomotive Co., who sailed from San Francisco recently for a year's tour around the world in the interests of the company and to study the foreign field preparatory to active competition for its trade, carried with him copies of a handsome brochure issued for foreign distribution among railroad officials and the buyers of locomotives. The text in English and French is descriptive of the organization of the American Locomotive Co. and its present and prospective facilities for the building of locomotives.

Edgar N. Smith, formerly roadmaster on the B. & M. R. railroad in Nebraska, and previous to that on the N. Y., N. H. & H. and the Boston Elevated, has accepted a position with the Railway Appliances Co., Chicago, giving his time particularly to the Q and C Bonzano rail joint.

An option on the Brownell boiler works, of Dayton, O., to expire on April 1, has been given to Cincinnati capitalists.

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MARCH 26, 1903

THE RIGHT TO WORK.

The time seems to have come in our industrial history when emphasis must be put in a definite way upon the right of a worker to work. So much respect is being given by certain classes of the community to the pronouncements of labor organizations, as though these constituted some new charter of human rights, superseding statutes and courts and the constituted authorities of state and municipality, that principles heretofore taken for granted need to be re-asserted as though new. In another column of this issue reference is made to a new movement which has taken root in at least two manufacturing communities, which has for its object the maintenance of the right of the individual to work when and under what terms he pleases. More will be heard of this principle, for in the confusion of authorities that has come with the rise of the trade union power, there appears to be need for instruction in things ordinarily considered quite rudimentary.

A certain sentimentalism came to the front in the hearing of the Anthracite Commission, with a justification of interference with the right of a minority to work when others chose to be idle. It was asserted that men who worked when others were striking were traitors to the good of their kind, in helping to defeat the aspirations of those who sought better conditions of employment. The logical outcome of that position is an assertion that all strikes are just and that all strikers' demands must be granted, and that no wheel shall turn except by the will of the strikers. Of course if those who chose to work were in a majority the preachers of this precious bit of sentimentality would be quick to defend them if they forced the striking minority to remain at work! The commission's finding is nowhere stronger than upon this very point:

> The right to remain at work where others have ceased to work, or to engage anew in work which others have abandoned, is part of the personal liberty of a citizen, that can never be surrendered, and every infringement thereof merits and should receive the stern denouncement of the law. All government implies restraint and it is not less, but more, necessary in self-governed communities, than in others, to compel restraint of the passions of men which make for disorder and lawlessness. Our language is the language of a free people, and fails to furnish any form of speech by which the right of a citizen to work when he pleases, for whom he pleases, and on what terms he pleases, can be successfully denied. The common sense of our people, as well as the common law, forbids that this right should be assailed with impunity. It is vain to say that the man who remains at work while others cease to work, or takes the place of one who has abandoned his work, helps to defeat the aspirations of men who seek to obtain better recompense for their labor, and better conditions of life. Approval of the object of a strike, or persuasion that its purpose is high and noble, cannot sanction an attempt to destroy the right of others to a different opinion in this respect, or to interfere with their conduct in choosing to work upon what terms and at what time and for whom it may please them so to do.
>
> The right thus to work cannot be made to depend upon the approval or disapproval of the personal character and conduct of those who claim to exercise this right. If this were otherwise, then those who remain at work might, if they were in the majority, have both the right and power to prevent others who choose to cease to work from so doing.
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> This all seems too plain for argument. Common sense and common law alike denounce the conduct of those who interfere with this fundamental right of the citizen. The assertion of the right seems trite and commonplace, but that land is blessed where the maxims of liberty are commonplaces.

When any other doctrine becomes dominant in the United States, the constitution's guarantee of liberty will be no longer effective, and trade union decrees, now so influential locally through the strike and the boycott, will become the supreme law to the man who would market the labor of his hands.

PATENT RIGHTS OF EMPLOYER AND EMPLOYE.

A condition exists in the acquirement of patent rights that at first glance appears paradoxical. Nor are the equities any too clear in all details even to those who administer patent laws. A case in point involves the question of patent ownership—a matter of the greatest importance necessarily, and peculiarly so when considered with reference to the relationship of employer and employed.

The Patent Office follows a policy in the allowance of independent patents which is as broad in one phase as it appears singularly narrow in another. Both aspects, however, have been the result of the operation of general rules to which there are few if any exceptions of note. The two contrasts may be well illustrated by the exceedingly liberal policy in granting patents for minute improvements. The change the inventor has wrought may be never so slight, may occasion the least amount of labor and expense, may mean but the most minor effect in operation and involve but a limited addition to the construction and function of the parts—all these may be trivial indeed and yet oppose no bar to the granting of a patent.

There is nevertheless an exception in sharp contrast to this general rule, and the point involved is not only of importance to workmen and their employers, but is unfortunately none too well known. Few employers work out the details of a patent. The work is frequently handed to a subordinate and the labor may again be entrusted to others who are employed jointly or independently as desired. The development may be carried to a successful conclusion with little delay, or the difficulties in the way

may cause temporary abandonment of the work, to be again taken up by the same force or a new one.

It is quite likely that the employer may have at the start but a meager conception of what shall finally be obtained by the labor of his employes. The probabilities are that the original idea has but paved the way to the later embodiment of the plan and that none but those familiar with the actual process of the growth could trace with certainty the steps by which the one has advanced to the perfected and final stage.

Now if we apply to such a condition the liberality of the Patent Office in granting patents to the designer of improvements, no matter how minute these may be, one can easily see how difficult the task for many employers of reducing the original conception to patentable and commercial form. There is, however, as has been intimated, a general rule which gives security to the employer under these circumstances, and the principle has been recently applied by the Commissioner of Patents in a case heard in appeal and which, by the way, reverses the decisions of both the examiners-in-chief and the examiner of interferences. The parties to the case were interested in the development of a cast steel car bolster, the one, H, calling upon the other, G, to work out under his direction an improved design. It is admitted by G that H had some conception of what he wanted; that the former was required "to work the case out for him" and that the "conditions" and the "cause" which warranted the making of the improved bolster were suggested to G by H. What G did, according to the testimony, was the necessary result of two things—first, the disclosures to him by H, and second, his employment by H to carry these disclosures into effect.

The examiners-in-chief who favored G in their decision, assert that, assuming that H at the time of the several interviews with G and his draftsman, had in contemplation the production of a special bolster, he did not at that time disclose to anyone the specific construction of the pending issue, the patent in dispute.

Commissioner Allen takes issue directly with the assumption that G is on this account entitled to the patent right. The commissioner is explicit on the point and holds that it was not necessary that H should have disclosed this feature and every specific feature of the issue in order to be entitled to an award of priority of invention. H disclosed the general principle of the invention, the broad idea, and engaged another to "perfect the details" and "to realize his conception." The employe, G, claims to have devised "new and valuable improvements in the original conception or invention." Granting that he did make these improvements they "belong to the employer and not to the employe." The commissioner quotes a decision of the Supreme Court of the United States to the following effect:

> No one is entitled to a patent for that which he did not invent unless he can show a legal title thereto from the inventor or by operation of law; but where a person has discovered an improved principle in a machine, manufacture, or composition of matter, and employs other persons to assist him in carrying out that principle, and they, in the course of the experiment arising from that employment, make valuable discoveries ancillary to the plan and preconceived design of the employer, such suggested improvements are in general to be regarded as the property of the party who discovered the original improved principle, and may be embodied in his patent as part of his invention.

In referring to this decision the Court of Appeals of the District of Columbia said:

> We regard it as well-settled law that, when one who has conceived the principle or plan of an invention employs another to perfect the details and to realize his conception and the employe devises new and valuable improvements in the original conception or invention, the improvements belong to the employer and not to the employe.

The Court of Appeals of the District of Columbia reaffirmed this rule in another case and recognizing the freedom of the usual practice of the Patent Office, added:

> And we do not understand that the exceedingly liberal policy of the Patent Office in the allowance of independent patents for minute improvements is to be regarded as contravening this rule.

The commissioner holds that H was the employer of G, and, in order to avoid misunderstanding, a few words of comment may be given to this phase of the case. The parties held this connection but temporarily, the former being the Western representative of an Eastern firm of car builders and the latter being the manager of another company. That he held this other position, the commissioner decided, did not change the fact that G was in no other capacity than that of an employe so far as this particular case was involved. That both men were in the employ of others was equally immaterial, and on the grounds stated priority of invention was accordingly awarded to H.

REPAIR COSTS ON WOODEN AND STEEL CARS.

On the much mooted question of relative costs of repairs on wooden and steel freight cars the figures of the Bessemer & Lake Erie Railroad for 1902 throw some light. In that year the company had in operation 5,287 steel freight cars and 2,089 wooden cars. The cost of repairs on the steel cars was $14.93 per car, and on the wooden cars the average was $49.61, or 3⅓ times as much. The disparity in proportion to carrying capacity would be more striking still, as the steel cars average about double the carrying capacity of the wooden cars. On the other side of the account, however, is the fact that the wooden cars in service are much older than the steel cars. In fact, 125 wooden cars had to be rebuilt, the cost of this being nearly a third of the amount charged as cost of repairs on wooden cars. The repairs to the steel cars cost $78,958.26, and to the wooden cars $103,571.82, this item including $31,508.78 for rebuilding the 125 wooden cars. A comparison with the figures for 1901 furnishes some indication that as either steel or wooden cars grow older the cost for repairs increases, since in 1901 the repairs to steel cars were $14.09 per car, and to the wooden cars $38.16. In that year there were 115 wooden cars rebuilt, at a cost of $24,940.05, this being included in the average cost of repairs to wooden cars.

IMPROVEMENT POLICY OF AMERICAN RAILROADS.

Recent railroad and other statistics exhibit in a striking manner the difference between American and British railroad management, which has brought American freight costs to a small fraction of the British, while it has made American railways by far the most important customers American steel works have.

We may assume, based on previous records, that about a fourth of last year's American rail production went into new railroads, leaving a balance of some 2,157,000 tons

for existing roads. These rails averaged about 80 pounds to the yard. In 1901 there was a total trackage in the United States of 266,000 miles, including second tracks and sidings. As the rails we assume for existing roads would lay 19,000 miles of track, it follows that such roads laid with new rails 7 percent of their trackage. Not all of this should be considered strictly "renewal," i. e., the taking up of an old rail and laying a new one. A portion, albeit small, went for additional second track and sidings. Each year now sees a much smaller proportion than formerly of new railroad lines built, but existing roads increase their trackage outside of renewals. It is certain that between 5 and 6 percent of the track existing in 1901 was actually relaid in 1902.

British railroads can show no such record. In 1901 British railroads used only 265,000 tons of rails all told, whether for renewals or extensions. We have no accurate data in British railroad mileage, but their percentage of renewals is evidently far below ours. The consumption of rails on British railroads constituted in 1901 only about 5 percent of the British steel production in 1901. In 1902 American railroads used rails amounting to 12 percent of the American steel production.

The difference is of course due to the fact that American railroads spend large portions of their current earnings for maintenance and betterments, while British railroads are managed on the most niggardly lines, in order to keep up dividends at rates not justified by conditions. As illustrating the large expenditures by American railroads, we can cite one of the best and steadiest dividend payers, the Pennsylvania Railroad. This portion of the greater Pennsylvania system, with about 3,000 miles of main track, has in the past 16 years paid out of current earnings $53,877,541 for improvements, and passed to surplus $22,216,880, or a total of $76,094,421. In the same period it paid out in dividends $114,509,465, so that out of every dollar of net earnings 60 cents were paid in dividends and 40 cents passed to the credit of the property. British railroad managers would shrink from the bare contemplation of the indignation of stockholders at the suggestion of such a division of earnings.

Yet with all this the Pennsylvania Railroad is increasing its capital stock for improvements, and its managers have enunciated as a new principle in modern railroad management, that large railroad corporations can no longer expect to make all the improvements called for out of earnings, and that increasing the capital stock must become a settled policy for such purposes.

It is this policy of improvement which has so greatly reduced the cost of moving freight on American roads. Taking the Pennsylvania Railroad again as representative, because on account of the mixed character of its freight and the heavy grades it encounters on the mountains it is representative of average modern costs rather than minimum, we find that on the 14,024,000,000 ton miles of freight handled in 1902 the expense per ton mile was .404 cent, the highest, by the way, since 1896, 1899 having shown a minimum, .344 cent. In 1893, nine years ago, it was .447 cent. In 1902 the earnings per ton mile, applicable to dividends, improvement and surplus, were .182 cent, the highest, barring 1901, of any year in the decade.

The plant and equipment of John Ramsey & Co., founders, Sixteenth St. and Lincoln Ave., Chicago, have been sold on a foreclosure sale.

PROPOSED ABSORPTION OF CARPENTER STEEL CO.

(Special Telegram.)

PITTSBURG, March 25.—The Crucible Steel Co. of America is negotiating for the purchase of the plant of the Carpenter Steel Co. at Reading, Pa. This is one of the largest independent crucible steel manufacturing plants in the country and its purchase would give the Crucible Steel Co. of America an output of more than 90 percent of all the fine grades of steel produced in this country. The Carpenter plant has four 30-pot crucible steel melting furnaces and five trains of rolls. In addition there are ten hammers, 40 heating furnaces and 5 puddling furnaces. The annual capacity is 9,000 tons of crucible steel ingots and 25,000 tons of rolled and forged products.

Official announcement of the consummation of the purchase of control in the Clairton Steel Co. by the United States Steel Corporation is expected daily. A few minor matters are awaiting adjustment and are the only obstacles to closing the deal.

New Castle to Have the Highest Furnace.

(Special Telegram.)

PITTSBURG, March 25.—The National Steel Co. will erect another stack at New Castle, Pa., to be known as No. 5, which will be a duplicate of No. 4, known as the McKinley Furnace. It will be 106½ feet high and 23 feet at the bosh. Its estimated daily capacity will be 600 tons. Work on this furnace will be pushed, inasmuch as additional iron for the steel plants at New Castle and Sharon is badly needed. It will be blown in about the first of next year.

More Pocahontas Coke Ovens Starting Up.

(Special Telegram.)

PITTSBURG, March 25.—Coking operations in the Pocahontas District in West Virginia were commenced by the United States Steel Corporation this week when 150 ovens were fired. The remainder of the 1,500 under erection will be fired within the next few months. The coke made at these ovens will be shipped to the Chicago district where the furnaces of the corporation have been operating badly on account of the coke shortage. Last week contracts were awarded for the erection of 600 additional ovens in the Pocahontas district.

Low Phosphorus Pig Iron.

A question being raised as to the designation "low phosphorus pig iron," we have made inquiries of the American Iron and Steel Association concerning the analysis of iron so classified in the annual statistics of the association. The low content of phosphorus and sulphur is the special characteristic of this iron which heretofore has been included with Bessemer iron in the statistics of production but will be separated hereafter. The standard market specification calls for phosphorus and sulphur at .03 percent or below, though iron running up to .04 or .05 percent has been accepted, but at a lower price. Low phosphorus iron is bought by makers of acid open-hearth steel, among them the manufacturers of locomotive tires and those manufacturers of steel castings who are required to meet Government specifications as to phosphorus and sulphur. In addition, low phosphorus pig iron enters into ingots for large forgings of acid open-hearth steel—gun forgings, shaftings, and to some extent armor plate. As none of it goes into a Bessemer converter it could not properly be classed as Bessemer iron.

The River Furnace & Dock Co., Cleveland, which recently completed the rebuilding of its furnace, has not been able to get satisfactory results and the furnace has been blown out to make further changes. It will not be in operation for about three weeks.

The American Can Co.'s plant at Conneaut, O., will be moved to Cleveland and be consolidated with the new plant now being built on Case Ave., which is nearly completed.

Issues Between Employers and Employees.

Official announcement has been made in New York of the organization of the National Association of Manufacturers and Erecters of Structural Steel and Iron Work, heretofore referred to in these columns. The purpose of the association is declared to be "the securing and preserving of equitable conditions between employer and employes whereby the interests of both the employer and employe will be properly guarded." It is intended that labor disputes affecting any part of the association shall be submitted to the whole body for settlement.

The following concerns have already enrolled as members: American Bridge Co., New York, N. Y.; George H. Fuller Co., New York, N. Y.; Terry & Trench Construction Co., New York, N. Y.; J. B. & J. M. Cornell, New York, N. Y.; Cooper-Wigand-Cooke Co., New York, N. Y.; John J. Radley Co., New York, N. Y.; Lewinson & Just, New York, N. Y.; Hecla Iron Works, New York, N. Y.; Richey, Browne & Donald, New York, N. Y.; Thomas Diamond, New York, N. Y.; Levering & Garrigues Co., Philadelphia, Pa.; Hay Foundry & Iron Works, Newark, N. J.; Milliken Bros., New York, N. Y.; Phoenix Bridge Co., Philadelphia, Pa.; Pennsylvania Steel Co., Philadelphia, Pa.; L. F. Schoemaker & Co., Philadelphia, Pa.; Belmont Iron Works, Philadelphia, Pa.; Boston Bridge Works, Boston, Mass.; Eastern Bridge & Structural Co., Worcester, Mass.; New England Structural Co., Boston, Mass.; G. W. & F. Smith Iron Co., Boston, Mass.; Chelmsford Foundry Co., Boston, Mass.; J. F. Croft Co., Boston, Mass.; Megquier & Jones Co., Portland, Me.; Boston Steel & Iron Co., Boston, Mass.; Smith & Lovett Co., Boston, Mass.; James H. Tower, Providence, R. I.; Builders Iron Foundry, Providence, R. I.; Springfield Construction Co., Springfield, Mass.; Riter-Conley Mfg. Co., Pittsburg, Pa.; Penn Bridge Co., Beaver Falls, Pa.; Champion Bridge Co., Wilmington, O.; West Virginia Bridge & Construction Co., Wheeling, W. Va.; Ft. Pitt Bridge Works, Pittsburg, Pa.; Heyl & Patterson, Pittsburg, Pa.; Columbia Bridge Co., Pittsburg, Pa.; John Eichelay, Jr., Co., Pittsburg, Pa.; Pittsburg Construction Co., Pittsburg, Pa.; Pittsburg Steel Construction Co., Pittsburg, Pa.; Brown-Ketcham Iron Works, Indianapolis, Ind.; Ohio Steel Erecting Co., Steubenville, O.; F. J. McCain Construction Co., Pittsburg, Pa.; R. S. Wright, Pittsburg, Pa.; L. Schreiber & Sons Co., Cincinnati, O.; McClintic-Marshall Construction Co., Pittsburg, Pa.; Wisconsin Bridge Co., Milwaukee, Wis.; Chicago Bridge & Iron Works, Chicago, Ill.; William Grace Co., Chicago, Ill.; Hansell & Elcock Foundry Co., Chicago, Ill.; Oliver Sollert Co., Chicago, Ill.; Kelly-Atkinson Construction Co., Chicago, Ill.; C. L. Strobel, Chicago, Ill.; Oscar Daniels Co., Chicago, Ill.; Modern Steel Construction Co., Chicago, Ill.

The growth of the International Association of Bridge and Structural Iron Workers during the past two years has made the organization of employers a necessity for self protection. Ever since the structural iron workers have had an international organization they have forced large advances in their wages and the employers have been compelled to submit, as there was no concerted action on their part for contesting these demands. Further wage advances are to be demanded this year, although the new scales that have been formulated for the various sections of the country have not yet been presented. At the present time they are receiving 50 cents an hour in New York and vicinity and it is probable that they will ask for an advance to 56½ cents an hour. At Pittsburg and throughout the entire Pittsburg district, which embraces the territory within a radius of 150 miles of Pittsburg, they are receiving 47½ cents an hour and their demands on May 1 will probably call for 50 cents an hour. In other sections of the country advances amounting to 10 percent will be asked.

The strike which was declared several weeks ago against the American Bridge Co. is still on, although work has been successfully started with non-union labor at Marietta, O., Toledo, O., and at Cleveland, O. The work on the Wabash Bridge at Pittsburg has not yet been resumed but it is probable that it will be before the end of the week as large gangs of men are being imported at Pittsburg. That the American Bridge Co. will not recede from the stand it has taken is certain. When the local union at Pittsburg was not in position to supply union men to do the false work on this bridge non-union men were employed. The discharge of these men was immediately demanded and when this demand was refused the union tied up all the company's outside work throughout the country. It is hoped that by the formation of the employers' association a repetition of such flagrant violation of the contract will be prevented and if it cannot be prevented it will be properly combated.

The manufacturers' organization is similar to other associations of employers in the metal trades. District executive committees have been appointed whose duty it will be to deal with the labor organizations in the different sections of the country and a secretary is in charge of affairs with headquarters in New York.

The Agreement with Chicago Brass Workers.

The substance of the settlement recently made by the Chicago Brass Manufacturers' Association with the brass workers' unions of that city was given in our last issue. Below we give copies of the original demand and of the agreement as entered into. Some features of "advanced" unionism that appear in the former find no place in the agreement as finally signed.

THE DEMANDS AS SUBMITTED.

This Agreement, made and entered into this..... of ....., 190.., between ..... of the city of Chicago, party of the first part, and the Metal Polishers, Buffers, Platers, Brass Molders and Brass Workers International Union of N. A., International Association of Machinists, International Union of Steam Engineers, International Brotherhood of Stationary Firemen, party of the second part. Witnesseth,

Art. I. The party of the first part hereby agrees to employ none but members of the aforesaid organizations or those who carry the regulation working card of the said organizations, provided the various crafts will furnish such competent help as may be required by the party of the first part within twenty-four hours after notification.

Art. II. On and after Jan. 20, 1903, nine hours shall constitute a day's work at the same rate of wages now paid the members of the various crafts constituting the party of the second part, except as modified in Article III.

Art. III. The minimum scale of wages shall be;

Polishers, buffers and platers	$2.50	for 9 hours
Brass molders	3.00	for 9 hours
Fox lathe hands	.32½	per hour
Speed lathe	.27½	per hour
Screw machine	.27½	per hour
Monitor hands	.25	per hour
Bench hands	.27½	per hour
Metal pattern makers and chasers	.35	per hour
Metal spinners	3.00	per day
Laquerers	2.50	for 9 hours
Furnace tenders	2.75	for 9 hours
Machinists	.30	per hour
Die and tool makers	.35	per hour
Engineers	.37½	per hour
Firemen	.25	per hour

And the party of the first part agrees that any one or all employes who are now receiving more than this minimum scale of wages shall suffer no reduction in wages by reason of the adoption of this agreement.

Art. IV. Time and one-half shall be paid for over-time, and double time shall be paid after twelve o'clock midnight; also for Sundays and the following legal holidays: New Year's, Decoration, Fourth of July, Thanksgiving and Christmas days; and under no circumstances shall a member be compelled to work on Labor Day.

Art. V. If two shifts are employed, single time only shall be paid, nine hours to constitute a day's work for each shift.

Art. VI. The nine hours' work by the men shall be between the hours of 7:30 a. m. and 5:00 p. m.

Art. VII. There shall be a steward for each craft in each factory appointed by the organizations, whose duty it shall be to see that the men working in said factory belong to the organizations.

Art. VIII. It is hereby agreed by the party of the first part that the business agent of the party of the second part shall

have the privilege of interviewing any member of the party of the second part in the office of the party of the first part during business hours.

Art. IX. In the event of any dispute or difference whatever between the parties of this agreement, the party of the first part and the representative of the party of the second part shall endeavor to effect a satisfactory settlement, and in case no settlement can be arrived at, then the party of the first part and the party of the second part shall each appoint two arbitrators and the four so appointed shall select a fifth, the five to act as a board of arbitration to whom the matter in dispute shall be submitted, and whose decision shall be final and binding on both parties to this agreement.

Art. X. A sympathetic strike to protect union principles shall not be considered a violation of this agreement.

Art. XI. All the apprentices shall belong to the union and carry the working card of the organization.

Art. XII. Apprentices leaving their employer before the expiration of their apprenticeship time, shall be requested to return to said employer; unless doing so, they shall under no circumstances be permitted to work under the jurisdiction of this organization. The number of apprentices not to exceed one for each ten men or less of the different crafts.

THE AGREEMENT AS ADOPTED.

Agreement between Chicago Brass Manufacturers' Association and the Metal Polishers, Buffers, Platers, Brass Molders and Brass Workers International Union of North America.

This agreement made this 3d day of March, 1903, between the Chicago Brass Manufacturers' Association and the Metal Polishers, Buffers, Platers, Brass Molders and Brass Workers International Union of North America, witnesseth:

That on and after Monday, March 9th, 1903, there shall be established in the plants of the members of the Chicago Brass Manufacturers' Association a work day of nine (9) hours, or fifty-four (54) per week; all over time shall be paid for at the rate of time and one-half and double time to be allowed for Sundays, Fourth of July, Labor Day, Thanksgiving Day and Christmas.

It is expressly understood and agreed that there shall be no arbitrary restriction of output on the part of employes in any of the departments of the plants of the members of the Chicago Brass Manufacturers' Association by the members of the Metal Polishers, Buffers, Platers, Brass Molders and Brass Workers International Union of North America.

During the life of this agreement there shall be no further demands made upon members of the Chicago Brass Manufacturers' Association by any of the members of the Metal Polishers, Buffers, Platers, Brass Molders and Brass Workers International Union of North America.

In case of any dispute arising which cannot be adjusted amicably between employer and employe it shall be referred to representatives of both organizations for adjustment, and pending such adjustment there shall be no cessation of work on the part of either party to this agreement.

This agreement shall go into effect Monday, March 1st, 1903, and will remain in effect until March 1, 1904.

Either party desiring a change in this agreement at the time of its expiration shall give at least 30 days' notice previous to March 1, 1904, to the other party, and failure to give such notice shall be understood as binding all parties to the terms of this agreement for another year from that date.

Independent Labor League of America.

Elmira, N. Y., is headquarters of the Independent Labor League of America, Inc. Emett Hildebrant, 553 Franklin St., is chairman. Its principles are set forth in the application for membership, a copy of which we reproduce below:

Believing that proper regard for personal independence among the citizens of the United States is essential to the prosperity of our nation, and to the highest good of the laboring people, I hereby apply to become a member of the Independent Labor League of America, the specific objects of which are:

First. To protect independent workmen in their independence.

Second. To oppose strikes and lock-outs, boycotts and blacklists.

Third. To obtain higher wages, shorter hours and better conditions, by: (a) More intelligent application of our energies. (b) Harmonious co-operation with our employers. (c) Legitimate business methods.

Fourth. To furnish favorable conditions for training apprentices, in order that our boys may become successful workmen.

Fifth. To compel officers of the local, State and National governments to enforce the laws and to compel labor unions and others to observe the laws.

Sixth. To protect members against unjust treatment from employers by due process of law.

Seventh. To provide an employment bureau for members.

Eighth. To provide means for members to guard against sickness and accident.

Ninth. To provide educational opportunities for all members.

Tenth. To provide in all lawful ways, for the welfare of the members and the maintenance of their rights under the laws and Constitution of the United States.

If elected, I shall endeavor to uphold the above principles.

Employers Organize to Protect Workers.

Manufacturers and other employers of Fremont, O., have organized the Fremont Citizens' Alliance, the principal objects of which are set forth to be the protection of its members against attacks by organized labor, to protect workmen in the right to work, whether they be union or non-union men. A labor committee has been appointed whose duty it will be to meet employers and employes between whom differences exist and if possible secure their equitable adjustment. At a recent meeting the alliance passed a resolution offering a reward of $100 for information that would lead to the arrest of any person or persons, who in any way threatened or intimidated any person or his family, preventing or seeking to prevent any man from working where and for whom he desired. The following resolutions were also adopted:

"WHEREAS, there is at present considerable trouble, strife and turmoil among a certain class of our citizens, in consequence of labor troubles in some of our factories; and

"WHEREAS, we are reliably informed that there are some who desire to work, but are prevented on account of fear of violence on the part of others and are intimidated and prevented in every possible way from exercising their natural born rights in the matter; be it therefore

Resolved that we, the Citizens' Alliance of Fremont, will stand together in any proper movement to preserve law and order, to protect the life and liberty of any man, union or non-union, who lawfully desires to exercise his right to work; to prosecute any person or persons who may unlawfully intimidate, interfere with or prevent any other person or persons from exercising the right and privilege to work for whom and for what they please. And to further the above end, we hereby pledge the sum of $10,000 or more, if necessary, to employ counsel and pay all necessary expenses attached to such prosecutions.

Troubles in the Metal Working Trades.

The strike at the Lorain yards of the American Shipbuilding Co. has been ended, the men having returned to work Monday. Laborers receiving $1.50 per day, but no others, were granted an advance of 10 percent. on condition that they and all others were to go back to work at once and make no further demands for advance in wages before June 1, and not then without giving thirty days' notice, during which thirty days they were also to remain at work; all strikers to be given back their old positions and not be discriminated against in any way. About 1,000 men were involved.

The molders at the plant of the Eastern Steel Co., Pottsville, Pa., demanded a large increase in wages and have been discharged by the company.

The Amalgamated Sheet Metal Workers' Union of Denver has ordered a strike for April 1st to compel master sheet metal workers to use piping and guttering made in Denver.

The molders employed by McIntosh, Seymour & Co., Auburn, N. Y., will work 9½ hours commencing April 1, and on Aug. 1 they will go on 9-hour time. It is said that other firms in Auburn will make similar concessions.

The Gaston Scale Co., Beloit, Wis., which recently discharged all the employes of its foundry, has adjusted differ-

ences with employes, who have returned to work. Both sides made concessions.

The strike of the 1,200 employes in the South Chicago yards of the American Shipbuilding Co., which has been in progress for nearly one month, was settled last week, and the men returned to work. The company grants a 10 percent. increase in wages and the 9-hour work day June 1.

To Protect the Right to Labor.

The Independent Mechanics' Union has been incorporated under the laws of Indiana to combat attempts being made by labor unions at Anderson, Ind., to prevent the employment of non-union men. Its objects are thus defined in the articles of incorporation:

"This association is formed to encourage industry, economy, thrift and honesty among its members; to maintain amicable relations between employes and employers of labor; to assist its members in obtaining the highest wages consistent with the general good of all concerned; to promote all forms of productive industry and increase the employment of labor at good wages; to prevent unjust and unreasonable discrimination against any of its members by any person, combination or conspiracy to prevent such members from securing employment in any branch of industry, and to protect and defend its members against any and all attempts by any person or combination of persons to abridge the inalienable right of all mankind to work for such wages as shall be mutually satisfactory to the individual workman and his employer."

Iron Molders' Union and N. F. A.

According to appointment, representatives of the Iron Molders' Union and of the National Founders' Association met at Detroit recently as a sub-committee of the conference committee that previously held a three days' session at Cincinnati. The sub-committee consisted of David Black, W. R. Perrine, Wm. H. Pfahler and Antonio C. Pessano. The questions discussed were limitation of apprentices, limitation of earning capacity and output, sympathetic strikes and wage differentials. The discussions were frank and earnest and it is no doubt a fact that both parties held somewhat modified views when the conference adjourned. The sub-committees did not disagree, but adjourned to meet whenever either side thought desirable, or that there was a prospect of an understanding on some of the questions involved in any attempt to secure a national agreement. It was not considered necessary to call a full meeting of the conference committee of the two associations.

Core Makers' and Molders' Amalgamation.

Following the favorable vote of the Core Makers' International Union on the proposition to unite with the Iron Molders' Union, representatives of the two organizations met and it has been arranged that the former shall go out of existence on May 2, 1903. Meantime plans will be made for taking over the core makers' local bodies, some at once and others later. It is understood that the core makers will hold separate charters, as the stove molders and bench molders do at present. They will thus have a measure of local autonomy, though as soon as they affiliate with the Iron Molders' Union they will come under the laws and agreements of the latter. Aside from preserving their craft distinction they become to all intents and purposes locals of the Iron Molders' Union.

The Clairton Steel Company.

The Clairton Steel Co., of Pittsburg, whose absorption by the United States Steel Corporation is expected, is a subsidiary company of the Crucible Steel Co. of America. The capital stock authorized amounts to $3,500,000, all of which is held by the Crucible Steel Co. of America, while bonds to the amount of $10,250,000, bearing 5 percent interest and guaranteed by the Crucible Steel Co. of America and issued in three series are outstanding. The company was organized and the plant built at Clairton, Pa., for the purpose of furnishing the Crucible Steel Co. with its supply of steel for all its plants. The plant at Clairton consists of 12 50-ton open-hearth furnaces, two of which are acid and the remainder basic. Three blast furnaces are under erection which will have an output of 1,500 tons of iron daily. They will be in blast about July 1.

A LARGE ORE CRUSHING PLANT AT ESCANABA.

In the $36,000,000 program of improvement work recently made public by the United States Steel Corporation was an item of $143,810 for a crusher plant at Escanaba, Mich., to have a capacity for crushing 510,000 tons of ore a year. This is the first of the central crushing plants planned for the Lake Superior mines of the corporation. The second is expected to be erected at Two Harbors, Minn., but no appropriation has been made as yet. The plant at Escanaba, for which plans are now being worked out in the office of Chief Engineer Frank Drake, of the Oliver Iron Mining Co. at Duluth, will take care of such ores shipped by way of Escanaba as require to be crushed to bring them to sizes most advantageous for use in the blast furnace.

The new crusher will be located about a mile from the docks at Escanaba, immediately adjacent to the yards in which the ore trains are received and sorted. The plant will be in two parts, one for crushing ores that will be coarse after breaking and the other for ores that are to be crushed fine. For the former only one machine will be used—a No. 9 Gates gyratory machine, the ore coming from it being at once in shape for shipment. For the fine crushing a second No. 9 Gates machine and two pairs of 36-inch Edison rolls will be employed. The No. 9 machine will give the fine-crushing ores a preliminary breaking. The ore will then be passed over a screen and thence to the first of the two pairs of rolls for further crushing; thence over a second screen, and finally to the second pair of rolls—the fine crushing thus being accomplished in three stages. Experience shows that the ore passing through the screens is a considerable proportion of the amount passing a given machine.

The two No. 9 crushers referred to above will be placed side by side in a deep pit, a large pocket being built above each crusher to receive the ore from the cars. The tracks serving the crushing plant will pass over the tops of these pockets, so that ore will be dropped directly from the cars into the pockets. From the latter it will be automatically fed into the crushers by pocket-discharge rolls of the Hoover & Mason design. The No. 9 crushers will each discharge onto a belt conveyor which will ascend at an angle of 18 degrees. In the case of the coarse crushing side this conveyor will discharge into a shipping pocket, from which the ore will be reloaded into cars for transport to the docks. In the case of the fine crushing side the conveyor will discharge into the first of the screens previously referred to, which will be placed over the fine ore shipping pocket. The material passing through the screen will drop into the pocket, and that passing over it will be carried by a second conveyor to the roll-house, where it will pass by gravity through the first rolls, thence over an intermediate screen and then through the second rolls. The fine crushed product will then be elevated by belt conveyors from the roll house to the fine-ore shipping pocket, whence it will be transported to the docks. The railway tracks by which ore will be received and shipped from the crushing plant will all be on a uniform grade, in one direction, of 1 percent.

In operating the plant, a train of cars of either fine or lump ore will be placed on the grade above the proper receiving pocket, and a car will then be dropped down by gravity until it is over the pocket, into which the ore will be discharged. The car will then be moved forward by gravity, on the same track, two car lengths, which will bring it in front of the shipping pocket for the same kind of ore. Here it will be reloaded with crushed ore and then dropped, still by gravity, to the storage tracks, where it will stand until a train has accumulated, which will then be taken to the docks. The shipping pockets for both lump and fine ore will discharge by the same automatic device that is used for feeding the No. 9 crushers, and all intermediate processes will be automatic, so that there will be no hand manipulation of the ore from the time it is unloaded into the receiving pockets until it is back in the cars ready for transportation to the docks.

As regards the power equipment for the plant, the coarse and fine crushing sides will be driven independently, each by a Russel four-valve compound condensing engine. The power required for the coarse-crushing side is about 250 h. p., and that for the fine-crushing side about 450 h. p. Steam will be supplied by two 250-h. p. Wickes vertical water-tube boilers. The buildings will be framed of wood, with brick or concrete filling and corrugated iron covering.

MELTING STEEL WITH CAST IRON.*

BY R. P. CUNNINGHAM, HOLYOKE, MASS.

The demand for castings of high tensile strength has increased to such an extent that many foundrymen have found the method of melting a certain percentage of soft steel with their iron a simple, safe and sure means of bringing their castings up to the required specifications in regard to strength. Probably no class of manufacturers are called upon to produce castings of high strength so often as pump and engine builders; yet tool makers find that owing to the high speed at which modern tools are run today they are obliged to make castings that will stand a higher strain than a few years ago. Pump builders a short time ago considered a pump that was working under a pressure of 2,000 pounds as being up to the limit, but now it is no unusual thing to receive an order for a pump working under a pressure of double that amount, and even 5,000 or 10,000 pounds is often called for. In the latter case the cylinders are of cast steel, the flanges and connections, etc., are semisteel, and we have found very little difficulty in making castings that would stand this enormous pressure.

Any one familiar with pump work will readily understand the necessity of having a perfect casting, not alone smooth and true to pattern, but clean and close grained, yet soft enough to machine easily. Many castings go through the machine shop and erecting room and fail when they are put on test. This makes it very expensive, as often the cost of machine work is many times the cost of molding. We have found that by a judicious use of steel scrap we in a great measure overcome this, especially if the trouble is a porosity of the casting. When melting steel with cast iron there are many things that require close attention in order to obtain the very best results. Regarding the method of charging the cupola you cannot be too careful. You should be absolutely certain that all the material called for in the charge is put in; the weight of each material specified should be correct; and fuel and fluxes should be known by chemical analysis, so that the exact chemical composition of all the material going into the semisteel may be known.

Our method of charging the cupola is as follows: Take, for instance, a heat of 4,000 pounds with 25 percent steel. We first put on the bed 1,200 pounds of coke, and on top of this put 1,000 pounds of iron, then 500 pounds of steel, then 500 pounds of iron, next 200 pounds of coke, 500 pounds of steel and 1,500 pounds of iron. The coke next above the semisteel charge should be greater than between the ordinary charges, and the pig iron in the first charge above the steel should be the same as in the semisteel charge, so that if any metal should melt and run into the steel it would do no harm.

Under all circumstances in making a high grade metal we have to contend with the impurities of the fuel and material charged into the cupola other than that which we have estimated on. All impurities in excess tend to weaken the metal in tensile and transverse strength. For this reason there is more difficulty in making a successful cast when using a large percentage of steel scrap. A high percentage of steel necessarily increases shrinkage, demands closer attention to rapid handling in the foundry, and when very high tends to make all operations connected with it draw away from those of a cupola metal and approach those of a steel casting. When this extreme point is reached semisteel is out of its province as a practicable cupola metal.

The average thickness of a casting bears a relation to the percentage of steel desirable. For thin castings a small percentage may be used, while for thick, heavy castings a high percentage is permissible. This is so because the thin casting has no self-annealing power on account of its rapid cooling and the chilling effects of the mold. The thicker casting, on the contrary, on account of its slow cooling, anneals itself and opens the grain of the metal perceptibly. The same metal which in a thin casting would be hard would be much softer in a heavy casting.

My opinion is that it is more desirable to have a mixture with the smallest percentage of steel that will give sufficient strength and solidity to your castings for all practical purposes.

We sometimes doubt the wisdom of the engineer when he calls for castings that will stand so many thousand pounds to the square inch, because the metal that will stand the highest test in a bar is not always the most desirable. It may be brittle or flabby with no elasticity and yet test high. What we aim for in practical foundry work is a high grade metal that will stand a fairly high test and machine easily. It is this kind of a casting that can be made with semisteel, provided the rules are accurately followed.

We have found that by using two brands of iron, one very high in manganese and the other high in silicon, both low in sulphur, we can get a much finer grained casting with more elasticity than we could if we depended on ferromanganese and ferrosilicon to bring these two elements up to the desired percentage. I reason in this way: If the manganese and silicon are in the pig they are more evenly distributed, having been done so by nature, than when they are put into the cupola and are depended upon to become thoroughly mixed in the cupola or ladle. We have never yet depended upon the pig iron for the entire amount of manganese and silicon wanted, but have each in proportion. This varies according to the weight of the casting. For the average run of work it is 1¼ pounds of each to every 100 pounds of steel.

There is a "metallic alloy" prepared by Hanson McDowell of Chicago which is used in connection with semisteel. For light work it prevents chilling. When using this alloy we leave out of the ferrosilicon and use the ferromanganese the same as before. When using the alloy it is put into the ladle after a small amount of the steel has been drawn into it. It is claimed by foundrymen who have used it that they get a better casting to machine than when they use ferrosilicon. As our castings run very heavy we have not noticed the difference between the two. Mr. McDowell claims that the use of the alloy adds at least 10 percent to the strength of castings. I am not prepared to disagree with him on that point, as we have never found any difficulty in getting the strength wanted with or without the alloy.

We sometimes have trouble caused by wrought iron getting into the steel scrap, or hard steel. In either case the results cannot be obtained. With hard steel the castings are full of hard spots. Wrought iron increases porosity, which is bad, if the casting is of uneven thickness. My opinion is that this mixture will in the future be used to a greater extent than it has been in the past, because the demand for it has increased, and foundrymen will readily see that by this means they can build up their present mixture to get any degree of strength desired.

[The writer gives the records of 18 heats, with varying percentages of steel scrap in the mixture. Three heats were run on a mixture containing 20 percent steel, and three respectively on 25 percent, 30 percent, 35 percent, 40 percent and 45 percent steel. The analyses of the resultant metal are given and show great uniformity. Every pound of metal that went into the cupola was weighed accurately; every particle of iron was saved, the cinders and what was chipped from the cupola being put into a mill and crushed to get the small particles of metal. This was done to determine the loss in melting. "We cast nine bars for tensile and the same for transverse strength. These were cast at different temperatures—that is, we cast three of each as hot as we could get the metal and three when the metal stood a few minutes and three just before the metal set. The analyses of the two pig irons used were as follows: Wharton, 2.12 silicon, 0.40 sulphur, 0.43 phosphorus, 0.75 manganese, 0.36 combined carbon and 2.98 graphitic carbon; and Poughkeepsie, 2.30 silicon, 0.20 sulphur, 0.56 phosphorus, 0.56 manganese, 0.30 combined carbon and 3.11 graphitic carbon."

The analyses of the cupola metal made from the 20 percent steel mixture ranged from 1.88 to 1.97 silicon; from .03 to .05 sulphur; from .43 to .54 phosphorus; .69 to .79 manganese; .37 to .41 combined carbon and 2.77 to 2.95 graphitic carbon. In the first heat the tensile strength was 28,710 pounds for the hot poured bar, 30,410 pounds for the second and 26,300 pounds for the third. The percent of loss in the cupola was 5.20 for the first heat, 5.50 for the second and 5.30 for the third. The

*From a paper read before the New England Foundrymen's Association.

higher percentages of steel show slightly higher losses of metal, the 25 percent steel mixtures showing from 5.60 to 5.80 percent loss, the 30 percent steel from 6 to 6.20 percent loss, the 35 percent steel from 6.20 to 6.40 percent loss, and the 45 percent steel all three 6.90 percent loss. The highest tensile strength shown was in the case of the second batch of bars from the 45 percent steel mixture, one of these reaching 33,960 pounds. The highest transverse strength was in a companion bar from this heat—3,360 pounds. The additions of steel did not make any corresponding variation in silicons The highest average silicon was in the 25 percent steel bars—2.01; the next highest was in the 45 percent steel bars—1.99 The graphitic carbon exhibits very slight variations.—Ed.]

In every case the No. 2 bar stood the highest test in both tensile and transverse strength, and only in two or three instances did the No. 3 bar break as high as the No. 1 bar. In every case No. 1 bar showed small blow holes. The No. 3 bars showed up badly in almost every case, while the No. 2 bars were perfect, with one or two exceptions. When we broke the No. 1 and No. 2 bars they broke with a sharp snap, while No. 3 bars broke with a dull sound. One would have no difficulty in telling which bar was on the machine by the sound of the breaking. There was not so much difference in the deflection as there was in strength. I think, if anything, No. 2 bars showed less than the others. The shrinkage proved to be greater than with gray iron.

Samples of planer chips taken from a large water cylinder cast with 40 percent steel and samples of chips taken from a large gear cast with 45 percent steel showed that it can be easily machined. I do not want anyone to infer from this that we never make a bad casting using semisteel, because we once in a while make a miss of it, but it can always be traced to the negligence of some one who failed to do as he was directed. In conclusion I will say this: That I do not believe that it is possible to make a successful cast every time with semisteel in any shop that is managed in a haphazard sort of a way, or where intelligent supervision is lacking.

One Grade of Steel for Structures.

At the fourth annual convention of the American Railway Engineering and Maintenance of Way Association at Chicago, March 17 and 18, the committee on iron and steel structures submitted an important report. Its chief feature was a unanimous recommendation which the convention adopted, that instead of a specification covering two grades of steel—"soft" and "medium"—there be one grade of rolled steel for all parts of a steel structure except the rivets. For rivets 50,000-pound steel is recommended. The introduction to the report states the matter thus:

"The question of grade of steel, which divided the committee last year, has been agreed upon this year. The subject has been pretty thoroughly discussed by the committee and among the profession at large during the year. Four members of the committee discussed the matter before the American Society for Testing Materials at its annual meeting last June at Atlantic City. The subject was discussed also at a late meeting of the Western Society of Engineers, and the present bulletin contains the result of a recent canvass of the association on the question. Our agreement is upon a single grade of rolled steel for all purposes except rivets, the desired ultimate strength being 60,000 pounds per square inch, with an allowed range of 5,000 pounds either above or below. In order to ascertain if the material is surely within this range, we demand two additional tests, if the original test shows more than 4,000 pounds above or below 60,000, and both of these retests must fall within the prescribed range to be acceptable."

The Girard Foundry & Machine Co., Girard, O., has absorbed the Davis-Walker-Cooper Co., of Youngstown, O., and all the machinery located in the plant at the latter place will be removed to Girard. According to the present plans of the company a large foundry and machine shop is to be erected at Girard to be completed about July 1. Officers of the combined interests have been elected as follows: Emanuel Hartzell, president; G. M. Gundy, secretary and treasurer; Frank Deemer, general manager, and James Cooper, superintendent.

EASTERN PENNSYLVANIA.

HARRISBURG, PA., March 25.—More furnaces are being blown in for the spring campaign, although the stock of coke is by no means as plentiful as desired. Still, with the starting of the independent coke plants along the lines of the main railroads there is steadily lessening danger of a famine. By this time next year hundreds of new ovens will have been completed, and the concerns which were dependent on Western concerns will be furnishing their own supply.

The Pennsylvania Steel Co. has started No. 1 Lebanon furnace, one of its large stacks at Lebanon, after a three months' suspension because of scarcity of coke. The Lackawanna Steel Co. will blow in another stack soon, and one at Sheridan will be started before long. In the neighborhood of Reading and along the Lehigh and Schuylkill there is hardly an idle furnace, whereas six months ago comparatively few were in operation. The output is being taken readily and shipments from the furnaces have grown. Many of the furnaces are well sold into the summer.

The annual meeting of the Temple Iron Co. was held at Reading on Friday, March 20, and the following were elected: President, George F. Baer; A. S. Law, Scranton, secretary and treasurer. The directors are the presidents of the anthracite coal roads. The company operates a furnace at Temple and large mines in the upper Susquehanna valley.

The Dauphin Bridge Co., whose plant near this city was burned a short time ago, has sublet its contracts and will rebuild.

The Reading Iron Company is running its forge on double turn and has enough orders on hand to run it until late in the fall.

The National Tube Co. will improve its works at Middletown, a number of contracts having been placed.

The Exeter Iron Co. has started its works at Reading after a shutdown of ten weeks due to scarcity of fuel. The works manufacture charcoal pipe iron and have an output of 250 tons a week.

The Reading Hardware Co. has absorbed the Keystone Hardware Co. to all intents and purposes and will invade the foreign market. Another merger at Reading is the combination of the shear concerns under the name of the Wilkinson Shear Co., with a capital of $70,000. The Emert and Hartzell company, of Gettysburg, will be part of the concern, which will build a large factory in Reading.

The Pennsylvania Steel Co. is making some improvements to its No. 1 blooming mill at Steelton.

The Reading Iron Co. will build one of the Brown wire guns at its Scott foundry department. The weapon will be considerably improved over the last gun, which was made at Birdsboro.

The Lalance & Grosjean Co. is arranging for a new tin set at its Harrisburg mills. An addition is contemplated.

The Milton car works are crowded with orders and are making a new style of gondola cars. There are more men employed at Milton than for a long time.

The Middletown Car Works have the contract for a number of cars for a Chinese railroad. The work is being hurried, and recently the painters were retarded by receipt of some Chinese characters which were to be painted on the sides of the cars. The specifications called for these letters, and they had to be placed.

Rambo & Co., of Swedeland, will erect a large plant on the Warwick furnace property at Pottstown for the manufacture of mineral wool from slag and cinder.

The Pennsylvania railroad will erect a large machine shop and other railroad repair buildings at Enola, its new town and yards near this city.

The National Bolt & Nut Co., of Pittsburg, has been incorporated. It has $50,000 capital, and the incorporators are G. A. Maetz, A. M. O'Brien and John S. Cort, Pittsburg. A charter has also been issued to the Hallan Construction Co., of Washington, Pa.

The F. Hersh Hardware Co. has been organized at Allentown, with H. D. Hersh, George D. Hersh, Arnold R. Lewis and D. L. Kistler, of Allentown, as directors. The company will build a plant. Its capital at the start will be $150,000.

Large Additions to Pig Iron Capacity.

When the additional pig iron producing capacity projected during the past six months is completed it will increase the country's estimated yearly output, by 2,600,000 tons, and plans decided upon during that period for rebuilding stacks will increase the possible production by fully 400,000 tons, making a grand total of about 3,000,000 tons a year to be added to the pig iron producing capacity during the next year and a half, provided all projects are carried out as outlined. New stacks projected number 17. None of this additional capacity will be available this year. In the summary published by *The Iron Trade Review* on July 31, 1902, 34 furnaces were shown under construction in the United States, with a total estimated capacity of 4,900,000 tons a year. As all of the new projects referred to in the first sentence above have taken form since the publication of our figures in July it can be seen that the proportion of increase to the country's pig iron producing capacity is not only being well maintained but if anything is on the increase. New stacks projected in the last six months and their estimated annual output are as follows:

National Tube Co., one stack at McKeesport, Pa., 166,000 tons; two stacks at Lorain, O., 347,000 tons.

National Steel Co., one stack at Youngstown, O., 250,000 tons.

Alabama Steel & Wire Co., four stacks at Gadsden, Ala.; work has been progressing on one stack for some time and when this is completed the remaining three stacks will probably be built. Capacity 700,000 tons.

Jones & Laughlin Steel Co. is having plans prepared for the erection of two additional stacks at its Eliza plant on Second Ave., Pittsburg, with a capacity of 300,000 tons.

The Southern Car & Foundry Co. purchased the machinery of the old Jupiter stack at St. Louis, Mo., and has removed the same to Gadsden, Ala., where a furnace with a capacity of 175,000 tons is to be erected.

The LaBelle Iron Works will shortly break ground for the erection of a second stack at Steubenville, O., to have a capacity of 150,000 tons.

Tennessee Coal, Iron & Railroad Co. is having plans prepared for the erection of a large modern stack at Ensley, Ala., to have a capacity of 175,000 tons.

The Shenango Furnace Co. has plans for two additional stacks at Sharpsville, Pa., to have a capacity of 300,000 tons.

The Valley Iron Co., of Birmingham, Ala., is erecting a new stack to have an output of 125,000 tons.

The Lookout Mountain Iron Co., of Birmingham, Ala., recently decided to erect a furnace at Battelle, in the Lookout Mountains, between Birmingham and Chattanooga.

In addition to the above the Pittsburg Steel Co. is considering the erection of two furnaces at Monessen, Pa., the official announcement of which is expected shortly. The improvement program of the United States Steel Corporation calls for the improvement of nearly all of its furnaces at Chicago and at Joliet, Ill., while stacks at New Castle, Pa., will also be remodeled. In the Wheeling, W. Va., district the Wheeling Steel & Iron Co. will rebuild the stack which recently toppled over at Martin's Ferry, O. All of the new furnaces to be erected or rebuilt in the North are to produce steel-making iron, while the furnaces in the South with the exception of those to be erected by the Alabama Steel & Wire Co. and the Tennessee Coal, Iron & Railroad Co. will produce foundry and forge iron. It is also probable that within the next six months the United States Steel Corporation will announce plans for a number of additional furnaces in the Pittsburg—at Duquesne and at the Edgar Thomson plant.

Of the 17 new stacks to be built the output of 13 will be utilized for the manufacture of steel in the plants of the companies erecting them, while the output of only four, amounting to less than 500,000 tons, will be offered on the market according to present plans.

Within the next six months the foundry and forge iron producing capacity of new stacks and those that are being rebuilt will increase the country's capacity by fully 900,000 tons a year. All of these furnaces have been projected during the past year and a half and with few exceptions would have been in operation at the present time but for the difficulties encountered in securing building materials and machinery. According to present indications these stacks will be blown in as follows:

Cleveland Furnace Co., one stack, located at Cleveland, daily capacity 400 tons—August. It is reported, although not officially confirmed, that as soon as this stack is in operation another of the same dimensions will be built.

Toledo Furnace Co., Toledo, O., daily capacity 400 tons—May.

Pioneer Iron Co., Marquette, Mich., 200 tons daily capacity, about to be blown in.

Detroit Iron & Steel Co., Detroit, Mich., furnace located on Zug Island. Daily capacity, 300 tons—July.

Rochester & Pittsburg Coal Co., DuBois, Pa., daily capacity 350 tons—July.

Buffalo & Susquehanna Iron Co., Buffalo, N. Y., two stacks, daily capacity 800 tons; will be blown in late in the year.

Penn Iron & Coal Co., Canal Dover, O., daily capacity 400 tons. About ready to be blown in.

Standish Furnace of the Chateaugay Ore & Iron Co., Standish, N. Y., will be started in July. Has a small output of charcoal iron.

In the South the Central Coal & Iron Co., Tuscaloosa, Ala., will have a stack in during the summer with a daily capacity of 200 tons.

The Woodward Iron Co., of Woodward, Ala., will likewise blow in its furnace with a daily output of 200 tons early in August, while the Alabama Consolidated Coal & Iron Co., Gadsden, Ala., will shortly have in its furnace with a daily capacity of 250 tons.

The Dover Iron Co., Bear Spring, Tenn., will shortly blow in its charcoal stack, with a small daily output.

Within the next six months not less than eleven furnaces for producing iron for steel making purposes will go into blast. One of these is Carrie Furnace No. 5 at Rankin, Pa. The three furnaces of the Clairton Steel Co., Clairton, Pa., are to go in in the months of April, June and August respectively, while the two stacks of the Union Steel Co. will start in August and September. The two furnaces of the Sharon Steel Co. will be blown in in May and September. A second furnace of the Lackawanna Steel Co. will come in in April, while its two large stacks will be blown in late in the summer. The remaining two cannot be completed until late in the year. These eleven large stacks will have an output of about 2,000,000 tons annually. The furnace of the South Chicago Furnace Co. which will operate on both foundry and Bessemer iron will be blown in early in May with a daily output of 400 tons.

Consolidated Lake Superior Co.

John W. Moffley, chairman of the stockholders' committee which is investigating the affairs of the Consolidated Lake Superior Co., has made public the statement of Vice President Search of the company. Mr. Moffley stated that the committee was satisfied with the statement, but that the inquiry would be continued. The statement, in part, is as follows referring to the values of properties:

Iron and steel plants and their accessories represent an investment of $4,430,300; mining properties represent an investment of $1,082,000; the Ferro-Nickel Reduction Works, at Sault Ste. Marie, fully equipped and in operation, represent an investment of $499,700; the transportation interests represent an investment of $9,482,200. This covers the cost of construction, equipment and terminal facilities of 106 miles of railroad, the cost of four ore steamers, two barges, three passenger steamers and several smaller vessels, and also the cost of grading the right of way for ninety-nine additional miles of track. The two pulp mills, one for ground wood and the other for sulphite pulp, represent an investment of $1,024,000.

In water power development and equipment the company has invested on the Michigan side $2,926,600 in addition to the proceeds of $3,500,000 of bonds issued by the Michigan Lake Superior Power Co. In sawmills and lumber operations the company has an investment of $268,700. The Tagona Water & Light plant represents an investment of $161,000 in addition to the sum invested from the proceeds of the $160,000 of bonds of that company outstanding. Offices, buildings and other real estate represent an investment of $296,900. The materials and supplies on hand at the different plants aggregate about $3,000,000.

ANNUAL CONVENTION OF THE N. M. T. A.

The annual convention of the National Metal Trades Association will be held at the Iroquois Hotel, Buffalo, on Wednesday and Thursday, April 1 and 2. In addition to the reports of officers, a number of papers will be presented on questions vital to the work of the association. The following subjects in the form of topical questions have been suggested for discussion:

1. Compulsory Arbitration: Is it desirable?

2. Agreements with Unions: Shall this association go into agreements, and on what terms?

3. Apprentices: Is there any justification for the limitation of apprentices by labor unions?

4. National Association of Manufacturers: What steps can be taken towards making this association a sort of clearing house of ideas for other associations?

5. Local Employers' Association: How valuable are they; how can they be started; how can their influence be extended?

6. Local Metal Trades Association: What should be their function; how can their efficiency be increased; how can they be brought into closer touch with the National body?

7. Boycott: What shall be done to meet it?

8. Conciliation: In how far is conciliation practicable, and what have other associations really gained by their conciliation committees?

9. Free Workmen: How can they be protected? Should this association in any way assist the counter organization of free workmen against the tyrannical methods of the labor organizations?

10. Good of the Order: What can be done to increase the benefits of the membership of the National Metal Trades Association, and increase the efficiency of this association's work?

11. Hour Question: What should be the policy of this association towards the shorter working day? Should the association take any definite action? Should the working day in our establishments be shortened? If so, how should the change be made; if not, how should the change be resisted?

12. Injunction Laws: How can they be preserved or improved?

13. Incorporation of Unions: Is there anything in the idea of union incorporation, and if so, how can same be brought about?

14. Insurance: Would it be practicable for this association to establish an old age pension for employes, something like the Pennsylvania Railroad, and if so, how?

15. Immigration: Should immigration be restricted, and to what extent? How can the foreign element be thoroughly Americanized?

16. Legislation—National, State, Municipal: What are the best means of arousing our members to the vital and pressing necessity of watching legislation; what is the best way for this association to act when confronted with adverse legislation; in how far would be desirable a limited federation with other employers' associations, looking to this end?

17. Labor Bureau, Local: Of what value are local labor bureaus, and what results have been accomplished by them?

18. Labor Bureau, National: Would it be advisable for this association to establish a labor bureau for the use of its members in times of peace, as well as in times of strike?

19. Limitation of Output: Do the unions limit output of our shops; if so, why; and what will be the logical results of such limitation?

20. Membership: What is the best way to increase the membership of the National Metal Trades Association?

21. Minimum Rate: Is a minimum rate a premium on inefficiency, making a man depend on the union keeping him in a position rather than his skill and ability; what is the result of a minimum rate, where already established?

22. Militia: Why do the unions forbid their members joining the militia or remaining in it; how can the anti-militia sentiment be counteracted; would it be advisable to give preference of employment to members of the militia, other things being equal?

23. National Civic Federation: Is it an honest effort to reconcile capital and labor, or is it a trick to ensnare capital and pull the wool over the eyes of the public?

24. Newspapers: What is their influence and responsibility for the spread or suppression of lawlessness during a strike?

25. Officials, Civic and Military: What can be done to secure their faithful efforts to suppress violence?

26. Premium System: Why does the union oppose premium work; what results are accomplished by the premium system in the shops of members of this association?

Volume II of "Analyses of Pig Iron."

The splendidly printed and illustrated quarto which S. R. Church, of San Francisco, has published as Vol. II of his "Analyses of Pig Iron" is a more pretentious work than its predecessor. With its red leather binding and its 197 pages printed on heavy coated paper, it has all the attractiveness of the best of the printer's and bookmaker's art. Mr. Church has certainly been indefatigable in the pursuit of pig iron analyses, not only those of irons manufactured in the United States—chiefly foundry irons—but of the brands of English, German, French, Belgian and Swedish makers. The analyses in Vol. II are in addition to those given in Vol. I, and the author is still following up the quest, promising Vol. III as soon as sufficient data can be collected. Mr. Church has produced a unique work, and it can be appreciated by any one who has attempted the collection of statistical information relating to the iron trade that he has conducted a vast correspondence to secure what he presents. The exhibit of the varying characteristics of pig irons sold in the various markets of the world is most interesting, though there is of course no guarantee that the analyses given represent accurately the average of the iron shipped from the furnaces represented. The early pages of the book contain an article by Thos. D. West on "The Utility and Mixing of Pig Iron," which presents much valuable material to which the peculiar title does not do justice. It is followed by an interesting historical sketch on "Thomas Iron," by F. H. Knight, assistant general superintendent of the Thomas Iron Co., Hokendauqua, Pa. A third article is a paper heretofore published on "Machine Cast Foundry Pig Iron," by Albert Ladd Colby. While Mr. Church's introductory material emphasizes chemical analyses, the plentiful and handsome display of pig iron fractures throughout the work is typical of a method of judging iron that evidently will long survive in the foundry trade. The price of the book is $5.

Juniata Steel & Iron Company.

In connection with the efforts to combine the independent sheet and tinplate works of the Central West, which is being promoted by A. M. Neeper, of Pittsburg, a circular has been issued to the stockholders of the Juniata Steel & Iron Co., of Greencastle, Ind. The company recently completed a plant having six hot and six cold mills, the site being furnished by the Commercial Club of Greencastle, which also pledged a bonus of $65,000, of which $40,000 has been paid over. In the original contract with the club it was stipulated that the plant could not be sold until after five years, but this feature was eliminated recently in the deed of the 25-acre site to the company. It is explained by officers of the company that it has been impossible to operate the plant because steel could not be had. The move of the independent companies is said to be in the direction of a combination which will enable them to secure their raw material in ample supply.

The Chicago Malleable Castings Co., West Pullman, Chicago, has installed many improvements recently to handle the increased output. The original plans of this company were drafted so that improvements could be made without erecting additional buildings, and the changes outlined below are in line with this policy: Four 30-ton annealing ovens, giving a surplus in this department; installation of a complete ventilating exhaust over core ovens; new batteries of friction exhaust tumbling barrels; new Sturtevant monogram type blowers for melting furnace; new 10-ton melting furnace. The output by May 15 next will be 75 percent larger than in 1902.

LAKE SUPERIOR IRON MINES.

The Iron Belt mine on the Gogebic range is nearing the close of its history, as it has been worked out and will be abandoned at a very early date. This mine first produced in 1889, when 30,000 tons were shipped. The total shipments have been 1,092,507 tons.

Diamond drilling on the Baker homestead on the Iron River, Mich., indicates that ore deposits in that locality may be somewhat more extensive than expected and may extend to property owned by Pickands, Mather & Co., but results of the drillings, so far as known, are not sufficient to form positive evidence as to the ore formation.

Extensive improvements have been made at the Great Western mine of the Corrigan-McKinney group at Crystal Falls. Sixty thousand tons have been hoisted this winter.

A. G. Clark, a mining engineer of Chicago, has located a body of iron ore in Menominee county, Mich., 14 miles from Norway, and will begin the work of development backed by Chicago capital.

The work of opening the Tesora mine, a Fay & Yawkey property on the Mesabi range, was begun last week. It is an underground proposition and a deposit of $1,000,000 tons has been shown by diamond drilling.

The Republic Iron & Steel Co. will increase its ore output from Minnesota this year by about 80,000 tons.

Obituary.

Wm. Laughlin, of Canton, O., vice president of the Cleveland-Canton Spring Works, Canton, a large stockholder of the Laughlin Nail Co., Martin's Ferry, O., and connected with other industries, died March 21 at Jacksonville, Fla., where he had gone for his health. He was 37 years of age.

Lyman S. Taylor, vice president of the Louisville Bolt & Iron Co., Louisville, Ky., died March 17, aged 67 years. He had been in the iron business since he was 21 years old and was the inventor of a nut making machine.

Thomas I. Rankin, of the Abram Cox Stove Co., Philadelphia, died at the hospital of the University of Pennsylvania, Philadelphia, on Sunday, March 22. He was in his 45th year. Mr. Rankin was an ex-president of the Foundrymen's Association and the members of that organization attended his funeral in a body.

A Method of Detinning Tin Plate.

A process for removing tin from the surface of other metals has been patented by Asahel K. Eaton, of New York. It consists in heating the tin plate in a bath of sodium bisulphate to form a compound of tin, then separating the bath and the metallic material from which the tin has been dissolved and separating out the metallic tin by electrolysis.

The American Rolling Mill Corporation has closed its plant at Muskegon for repairs and informs us that the plant will be in operation just as soon as the repairs can be completed.

The International Ballot Machine Co., of Cleveland, has been capitalized under New Jersey laws for $500,000. The company contemplates the erection of a plant in or near Cleveland for the manufacture of the voting machine invented by L. R. Winslow, of Kansas City.

The Brown Corliss Engine Co., of Corliss, Wis., recently received an order from the Middlesex & Somerset Traction Co., of New Brunswick, N. J., for one 16 and 30x42-inch horizontal cross compound engine and one 18 and 34x36-inch vertical cross compound engine; also an order from the American Locomotive Co., Dunkirk, N. J., for one 26 and 42x42-inch tandem compound engine.

The National Coal Burning Co., Cleveland, has been incorporated under the laws of New Jersey with a capital of $125,000. The directors are A. L. Wilcox, E. L. Rowe, C. O. Bartlett, J. L. Gibson and A. B. Conkey, all of Cleveland, and J. G. Duffy, of Jersey City, N. J. The company will manufacture at the plant of the C. O. Bartlett & Snow Co., Cleveland, machinery for grinding and pulverizing coal under the Rowe patents and will also turn out elevators and dryers. The company has temporary quarters at 212 Seneca St., Cleveland. It is claimed that under the Rowe process of burning coal perfect combustion is obtained, saving 25 percent in the amount of coal used and abolishing the smoke nuisance.

Semi-Annual Meeting of the A. S. M. E.

The spring meeting of the American Society of Mechanical Engineers is to be held in Saratoga, N. Y., beginning June 22. This date is chosen in order to avoid the meeting of the Institute of Electrical Engineers, the following week, and the important railroad conventions of the week preceding. The features of the meeting will be the discussion upon the proposed amendments to the rules, which shall create a constitution and by-laws, and by visits and excursions to Schenectady and Lake George. It has been thought desirable that papers on shop management and kindred topics would make a line of discussion of special interest and value, in connection with the large establishments which are to be visited at Schenectady.

The Wagener Steam Pump Co., Louisville, O., has been incorporated with a capital stock of $30,000 fully paid up. This organization is to succeed The Wagener Pump Co., formerly owned and operated by W. H. Wagener. The new organization is preparing plans for a new and modern shop building, and has already purchased some of its new machinery, and is in the market for still other additional machine tools. The plant will be equipped for the manufacture of steam pumping machinery up to a capacity of 2,000,000 gallons per 24 hours, both of the single and duplex pattern. The company is in the market for a standard tubular boiler, 60 inches by 14 feet, also a 50-h. p. automatic engine.

The balance sheet of the Passaic Rolling Mill Co., which has been merged with the Passaic Steel Co., as Jan. 31, 1903, shows the following: Assets—Property and plant, $1,625,187; investments, $16,150; inventory, $472,746; current assets, $475,277; insurance paid in advance, $996; total assets, $2,590,359. Liabilities—Capital stock, 2,000 shares at $100, $200,000; accounts payable, $152,486; wages accrued, $10,656; taxes accrued, $600; interest unearned on notes, $532; profit and loss, $2,226,085; total liabilities, $2,590,359. The Passaic Rolling Mill Co. was merged with the Passaic Steel Co. on Feb. 16, 1903, the Passaic Steel Co. taking over the entire assets of the Passaic Rolling Mill Co as they stood at the close of business Jan. 31, 1903, the new company giving $5,000,000 par value of its capital stock and $2,000,000 par value of its bonds in exchange for the entire capital stock of the Passaic Rolling Mill Co., which was cancelled and retired, the bonds being secured by a mortgage to the Citizens' Trust Co., of Paterson, N. J., Trustee, covering the entire property, plant and assets of the combined companies.

William H. Hill, general sales agent of the Mount Union Silica Brick Co. and the Savage Fire Brick Co., Park Building, Pittsburg, secured an order last week for 800,000 brick from one concern and was also awarded a contract for 1,000,000 brick by the Republic Iron & Steel Co.

The H. C. Frick Coke Co., Pittsburg, awarded contracts this week for the erection of 600 additional coke ovens in the Tug River district in West Virginia and also let contracts for the erection of 120 additional ovens in the Connellsville region.

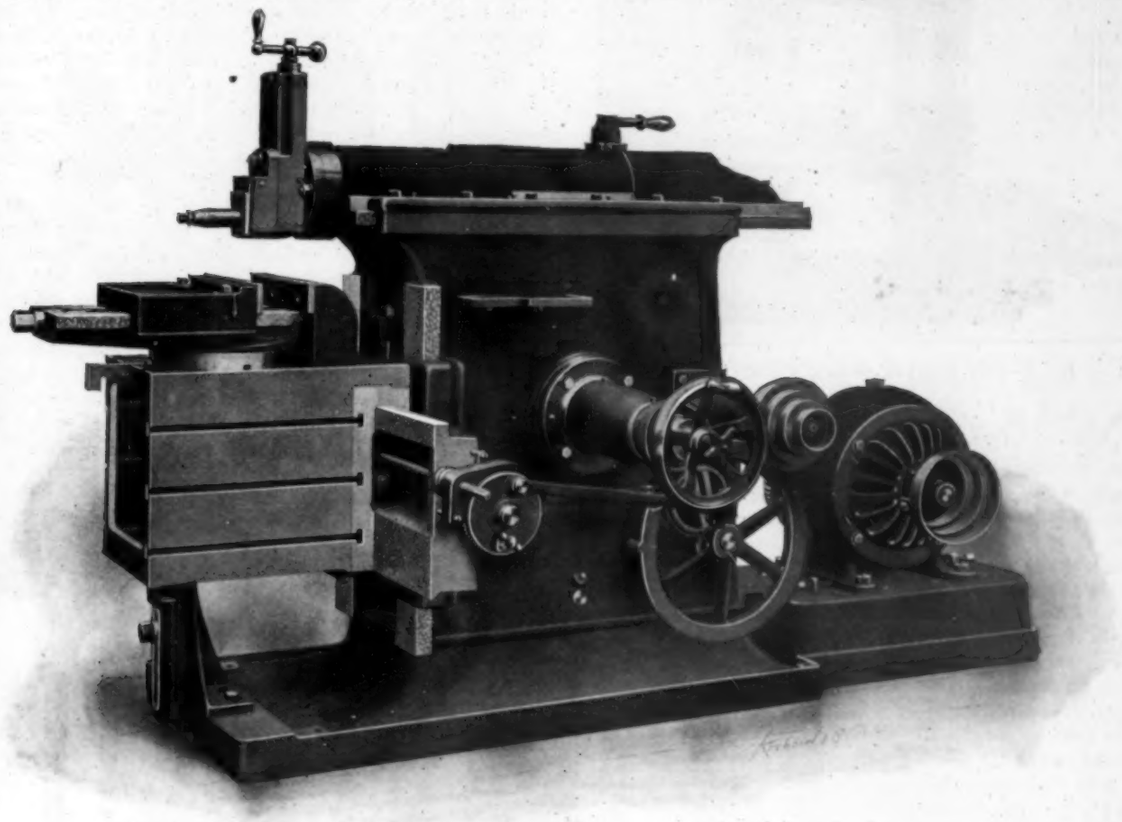
The plant of the Canonsburg Iron & Steel Co., which has been idle for some time, resumed partial operation this week. Two of the five sheet mills were placed in operation and it is probable that the remaining three will be placed in operation within a few weeks. The plant is located at Canonsburg, Pa.

H. Clay Moore, No. 816 Empire Building, Atlanta, Ga., has been appointed sole agent for the Southeastern part of the United States for the Scaife and We-Fu-Go systems of water softening and purification, manufactured by Wm. B. Scaife & Sons Co., of Pittsburg. Mr. Moore is well posted on water softening and purification, and is well known throughout the South in manufacturing and engineering circles.

MOTOR-DRIVEN BACK-GEARED SHAPER.

The American Tool Works Co., of Cincinnati, has just brought out a motor-driven back-geared shaper which is illustrated herewith. The motor is mounted on a substantial base directly back of the column. It is of the constant speed type, running at a high velocity, the proper variation in cutting speed of the ram being obtained through a pair of cone pulleys. One is mounted directly on the motor shaft, the other on a stud on the column. The cone on this stud carries a pinion, which meshes into a larger gear on the end of the driving shaft. This arrangement gives the belt a high velocity. This method of drive has proved satisfactory wherever installed and the application can be made at a moderate cost.

The column is deep and wide, and projects both front and rear at the top, giving the ram extra long bearings. The ram has long, wide bearings, with improved oiling facilities, and is well gibbed for taking up wear. Stroke of ram is positive, and has eight rates of speed. Length may be changed at will, without stopping the machine, and an index shows the length of stroke as set. The rocker arm is pivoted near the base line, giving the ram an almost uniform rate of speed its entire stroke, and providing an exceedingly quick return. Machine has high back gear ratio for heavy cuts. The head swivels to 50 degrees and has large tool post for holders with inserted cutters. Table is box form, T-slotted on top and sides, and is readily detachable from apron. The cross-feed is automatic, and adjusts itself to position of cross-rail. The double section rocker arm permits 3½-inch shaft to be passed under the ram. Regular equipment includes swivel vise, countershaft, wrenches and tool shelf.



THE AMERICAN TOOL WORKS CO.'S NEW MOTOR-DRIVEN SHAPER.

Max Daunert, manager of the New York offices of the German machinery house of Schuchardt & Schutte, which has purchased large quantites of American machine tools for the German, Austrian and Belgium markets, has sailed for Europe for the purpose of assuming the management of another European branch about to be established by the firm. Ernest Mueller, of the Berlin offices of Schuchardt & Schutte, will arive in New York shortly to take charge of the offices there.

CONTINUED PROSPERITY EXPECTED.

The following statemet was made last week by a representative of the United States Steel Corporation:

"It is not strange that the iron and steel companies are making remarkable showings in earnings. Production is not only larger, but the margin of profit is wider as a result of the movement toward the concentration of capital. There is not a weak spot in the entire situation. A considerable amount of business for bridge and structural material, calling for delivery in 1904, has been booked. We could sell railroad and railway equipment far into 1904, but do not care to do so, as we cannot forecast what the current year will bring forth in the way of changes. In the event of good crops this year, the prosperity the iron and steel business is now enjoying will be continued throughout the Presidential campaign. I do not expect to see any really serious labor trouble this spring. Steel workers are getting higher wages than ever before, and appear to be thoroughly satisfied."

President Stackhouse, in his report to the stockholders of the Cambria Steel Co., made this statement: "Your output was very seriously curtailed and cost increased by the inadequate transportation facilities furnished by lines connecting with your works, both in your supply of raw material and shipment of finished products. The unfilled orders on your books are greater than ever before, and you are forced to turn away many large and satisfactory orders. There is no reason to believe there will be a serious break in the prosperous conditions now prevailing. Shipments of steel show an increase per month, compared with the preceding year, of 19 6-10 percent in quantity, and the gross value of your product increased 42 8-10 percent.

"In addition to $2,145,997 spent upon improvements, there has been expended for extensive replacements and alterations and charged to operating cost, the sum of $404,274. The improvements authorized and under way on Dec. 31 last called for an expenditure of $2,000,000. In addition to this sum, it is expected that appropriations will be made from time to time during 1903 for other improvements considered essential in so far as your finances and the economical employment of your forces will permit."

THE MUELLER 36-INCH RADIAL DRILL.

An illustrated description of a 62-inch radial drill manufactured by the Mueller Machine Tool Co., of Cincinnati, was published in *The Iron Trade Review* of Dec. 4, 1902, page 75. The company has since designed a smaller machine, 36-inch, which contains the features of the earlier pattern, as shown somewhat more in detail in the accompanying illustrations.

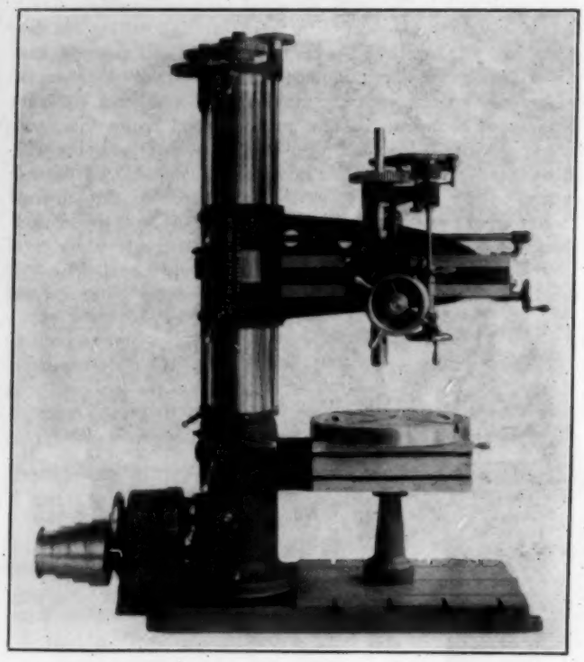


FIG. 1.—THE MUELLER 36-INCH RADIAL DRILL.

The column has a heavy section throughout and is made of one piece. It is bolted to the base and there are four webs inside, extending the full length, which greatly add to the strength of the machine, especially when the arm and spindle are at their maximum distances. Just above the swinging platen around the column there is a graduated ring that revolves with the arm. This is a useful feature when duplicating parts held in fixed jigs that are either clamped on the base or platen, as the spindle can be brought exactly to its former position, to a zero line on the stationary column.

The arm is made in pipe section, its upper brace being as close as possible to the head, while the lower one is at the outer edge. (See Fig. 3.) This is done to avoid any twisting of the arm while receiving severe upward pressure of the spindle when drilling. A top cap resting on roller bearings supports the arm, both making a full circle about the column, and can be instantly locked by fixed binder levers. The arm is lowered at almost three times the elevating speed, by a screw having ball thrust bearings and which is driven from the center shaft without the use of any intermediate gears. A bronze plate is attached, showing the operator immediately the correct spindle speeds for drilling either cast iron or steel.

The head can be locked to the arm and is traversed by means of a double pitched screw that engages with a revolving dial on the outer end of the arm, enabling the operator to bring the head within .001 of an inch to a required place.

The spindle is made of crucible steel, is ground, counterbalanced, has quick advance and return, also means for taking up wear. When used for tapping of holes, it is impossible to engage (through any accident) either automatic or lever feed, thus eliminating the breaking of taps. A gauge screw causes the spindle to stop when the tap reaches the bottom of a hole. It takes only four seconds to change from 18 to 370 revolutions of the spindle per minute, or any of the 16 available speeds that are all arranged in geometric progression, the maximum being more than twenty times the minimum. Each of these speeds is instantly obtained; also the elevating and lowering of the arm are fully controlled by the single convenient starting lever extending from the loose ring encircling the column and above the swinging platen. This ring is adjustable to any part about the column and is connected on the inside of column to a rod S operating the two noiseless friction clutches on shaft N. When the spindle is not in use, the lower driving shaft Q is the only one in motion, thus prolonging the life of the machine. When the starting lever is pushed to the left, the friction clutch P causes gears G and H to drive the shaft N at a low speed. When the lever is pushed to the right, clutch P causes gears I, L, K and J to drive shaft N at a higher speed. The crank shown on the lower part of column is used to raise or lower the shaft R inside of column. By allowing the gears C and B to mesh, two changes of speeds are delivered to the spindle through means of the starting lever, and in meshing gears E and A two faster speeds are given, thus getting four speeds from each of the four steps on the cone. This is how the 16 spindle speeds are obtained. When reverse motion of spindle is required, the tumbler O is changed, causing gears I, M and J to run shaft N in the opposite direction also at an increased speed. In elevating or lowering of the arm, the lower crank on column is pushed to the right, causing shaft R to engage gears D and F, which drive the elevating screw.

The automatic feed is driven through a friction plate fastened to the spindle pinion shaft. (Figs. 2 and 3.) By bringing the small friction wheel above, from the center to the outer diameter of this plate (by means of a rod which has the ratio marked) any feed from zero to .023 per revolution of spindle can be instantly obtained, also while drill is at work. The amount of friction required for light and heavy drilling is regulated by a knob shown on the right of feed shaft. (Fig. 3.)

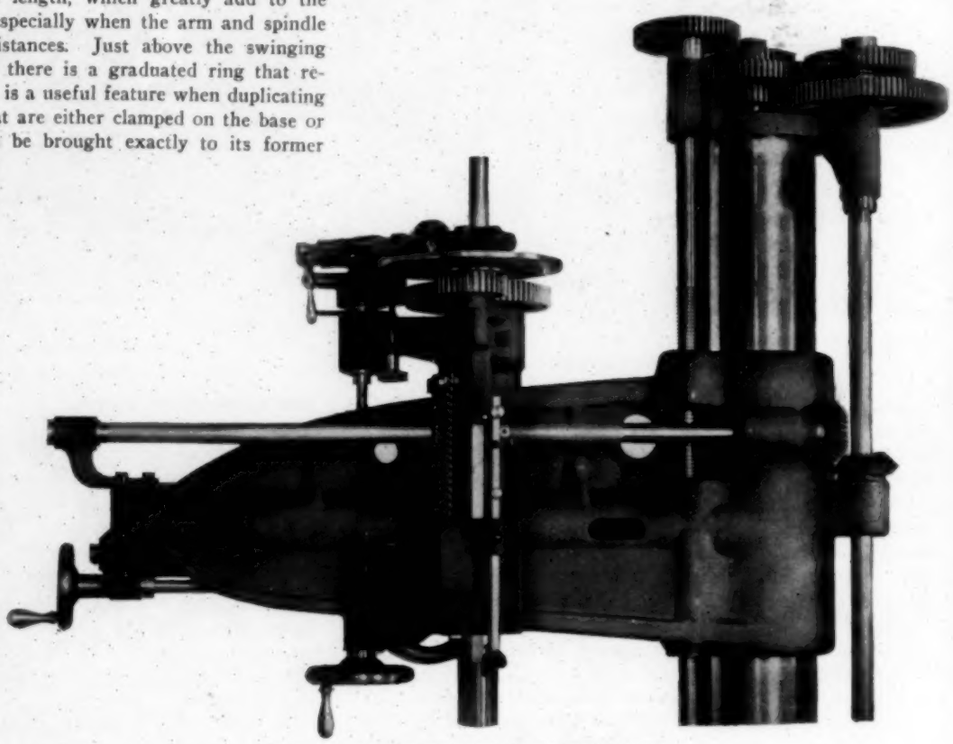


FIG. 2.—RADIAL ARM AND FEED MECHANISM.

The automatic trip is provided with a safety stop that prevents feeding of the spindle after reaching the limit of its

stroke. A graduated bar is on a counterbalancing weight which is set to zero when drill enters. This bar has several adjustable dogs to trip the feed as often as desired, and does not interfere with the spindle stroke. The automatic feed can

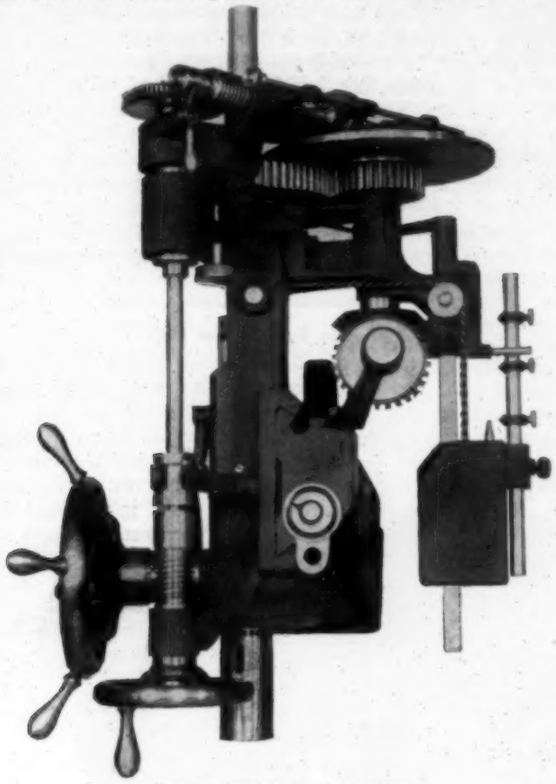


FIG. 3.—END VIEW OF ARM.

also be tripped by the lever shown on vertical feed rod. (Fig. 3.)

The base is deep and very heavy, having fan-shaped ribbing, all leading to the center of the column. This feature gives extreme stiffness, no matter where pressure of the spindle may come.

The platen is usually plain, but can be furnished with round or swivel table instead. It has also a round boss in its center that can be bored to receive bushings for boring bars which pass through the center of the supporting stand on the base.

All binder levers are forced on their screws (that have tapered ends) by a small nut, so that in case of wear they can be released and set to suit the operator. The net weight of this machine is 3,800 pounds.

Increasing Employment of Steam Turbines.

A recent computation has placed the total aggregate power of steam turbines in use or under construction or ordered in different parts of the world at over 500,000 h. p. Of this total, the major portion is used or to be used for the driving of dynamos, alternators, or other electrical machinery, while the next in point of power consumption is marine engines.

An item in point is the contract recently given to the British Westinghouse Electric & Mfg. Co., Ltd., by the Metropolitan District Railway Co., of London, Eng., for four turbo-alternators. Each of these machines is designed for a normal capacity of 5,500 kilowatts, but will be capable of carrying an overload of 50 percent, giving for each unit a maximum output of 8,250 kilowatts, or about 11,000 e. h. p. These turbines will be not only the largest steam-turbines ever made, but also the most powerful single cylinder engines of any type whatever in the world. Very few multiple cylinder engines existent have greater power. Notwithstanding the enormous power they will develop, these engines are only 29 feet in length, by 14 feet wide, by 12 feet high, the over-all length of turbine and alternator being 51 feet 9 inches. The steam pressure will be 165 pounds per square inch, and the speed 1,000 r. p. m.

The navy department has received bids on the proposed steel floating dry dock for the Philippines, which will cost about $1,400,000, delivered at Cavite. The United States Shipbuilding Co., Jersey City, the Maryland Steel Co., Sparrow's Point, Md., and C. L. Dutton, Yonkers, N. Y., are the bidders.

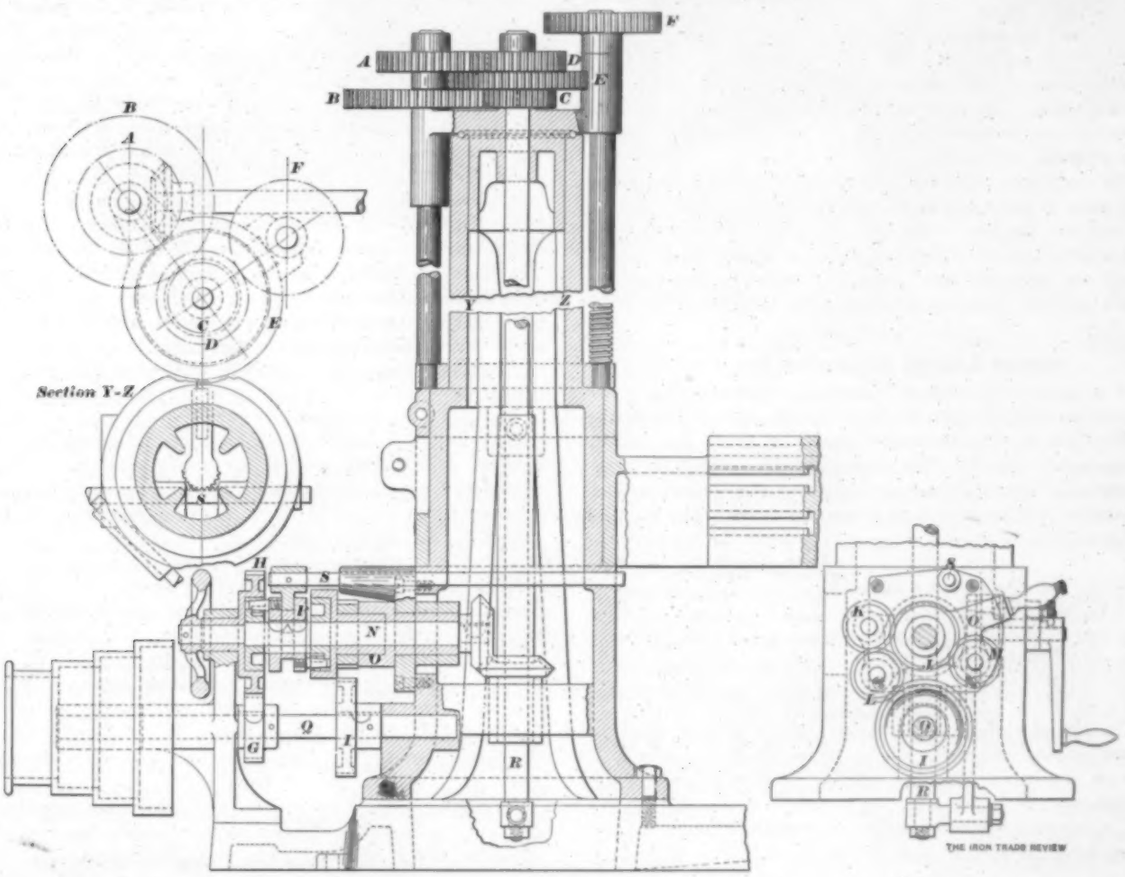


FIG. 4.—SECTIONAL VIEW OF NEW RADIAL DRILL.

THE FARWELL STOOL PLATE MOLDING MACHINE.

We give below an illustration of the Farwell stool plate molding machine made by the Adams Co., Dubuque, Iowa, which is designed especially for stripping plate work where stooling becomes necessary. In this machine the pattern at all times rests upon the rigid frame of the machine, giving a solid foundation to all parts that are subject to strain when the sand of the mold is being compressed, instead of supporting these by cranks and connecting rods. In the ordinary stripping plate molding machine it has been found impracticable to press the sand where the patterns have been supported by toggle joints, as these are subject to wear and will spring under the pressure

THE FARWELL STOOL PLATE MOLDING MACHINE.

exerted when a mold is being rammed or pressed by mechanical means, although this will not occur when using hand rammers. In the Farwell machine the stripping plate is raised, thus stripping the pattern.

The stool plate takes care of the stooled parts of the stripping plate or parts which are isolated from the main plate, as, for instance, the hole in the hub of a wheel or the parts lying between the spokes. To make a closer fit babbitt metal is used where the stripping plate meets the pattern. The machine shown will take flasks up to 18x24 inches in size.

Proposed Changes in Canadian Iron Tariff.

After months of work the Canadian Manufacturers' Association has decided upon many points in the revision of the tariff which it is proposed to bring up before the present session of Parliament. The encouragement granted the manufacturer of iron and steel in Canada by the Dominion Government is part bounty and part customs duties. The bounties are as follows:

	From native ore.	From foreign ore.	On steel.
To April 21, 1902.....	$3.00	$2.00	$3.00
April 21, 1902, to July 1, 1903....	2.70	1.80	2.70
July 1, 1903, to July 1, 1904....	2.25	1.50	2.25
July 1, 1904, to July 1, 1905....	1.65	1.10	1.65
July 1, 1905, to July 1, 1906....	1.05	70	1.05
July 1, 1906, to July 1, 1907...:	60	40	60

The manufacturers now propose that a general tariff be placed on steel and iron. The tariff on pig iron is now $2.50 per ton and it is proposed to ask $3. Steel rails are now admitted free. It is proposed that the tariff be placed at $7 per ton, which at the present market price would amount to about 25 percent. Scrap iron and steel to increase from $1 to $1.50 per ton; iron bars from $7 to $8 per ton; steel billets from $2 to $4 per ton; structural steel $7 per ton, the same as at present, the difference being that it is proposed to widen the present act, if possible, to include all sizes weighing up to 45 pounds per lineal foot, whereas the present act only protects up to 35 pounds per lineal foot. The duty on skelp, will, it is proposed, be increased from 5 percent ad valorem to $6 per ton. It appears that the Montreal Rolling Mills Co. has skelp mills idle, at present, and at the same time is importing skelp from Germany. In other instances pig is being manufactured in Canada, sent to Germany and the skelp returned for consumption in Canada. Wire rods are now free, but a duty of $6 per ton will be asked. A general readjustment of manufactured goods such as switches, nails, wire, tacks, agricultural implements, engines, and in fact all finished iron products, will also be asked.

Colorado Fuel & Iron Co.

The new Bessemer plant of the Colorado Fuel & Iron Co. at Pueblo, Col., has been in operation for some weeks, with satisfactory results. For a time the old plant was kept in operation after the new one started, but the former is now being dismantled. The oldest blowing engine will be scrapped, another will be added to the blowing equipment of Furnace C. The two new Bessemer converters are of 15 tons capacity each and it is expected that they will turn out 1,200 tons of ingots in a turn. The new open-hearth furnaces, of which there are six of 50 tons capacity each, will be started up about May 1, and the new blooming mill and the No. 1 rod mill will be put in operation also. With the new Bessemer and the new open-hearth departments running full the company will have a capacity of about 3,000 tons of steel a day.

Growing Use of Roofing Tin.

Statistics indicate that during the last three or four years, or since the American Tin Plate Co. began to reform the methods of producing terne plates the efforts of that company to re-establish the old time prestige of roofing tin have been quite successful. The use of terne plate, especially of the higher grade brands, has increased to a very great extent. When the American Tin Plate Co. came into possession of all the larger tin plate works in the country, it also gained the services of the best experts in this branch of industry. Their combined experience and knowledge, as well as that of the experts engaged by the United States Steel Corporation, have been at the disposal of the American Tin Plate Co. This fact, and the combination of strict supervision and systematic mill practice which prevails in the company's works, have contributed to the production of high-grade material. The best known brands are the "MF" Old Style and the "U. S. Eagle N. M.," but besides these the company makes a variety to suit varying requirements. Recently the American Tin Plate Co. issued a handsome booklet entitled "A Fifty Year Roof," which gives a history and description of terne plate making, together with much useful technical information. W. C. Cronemeyer, the agent of the company, 1211 Carnegie Building, Pittsburg, will send this booklet to all applicants.

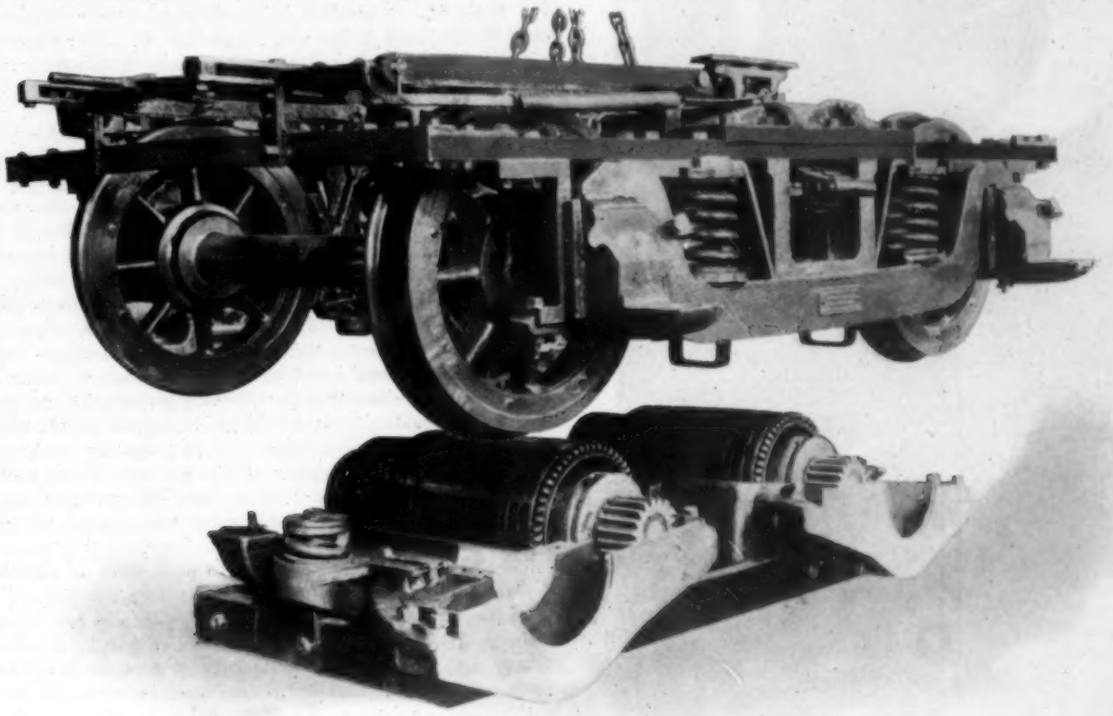
Fifty thousand $50 shares of the Scotch Locomotive combination, which were offered for public subscription, have, according to a cablegram from London, been subscribed for fourteen times over. In other words, $35,000,000 was subscribed for $2,500,000 of stock.

At the meeting of the new board of directors of the Sloss-Sheffield Steel & Iron Co., the following officers were elected to serve for the ensuing year: President, J. C. Maben; vice president, Joseph Bryan; second vice president, J. W. McQueen; auditor, E. J. Thomas; assistant secretary, H. A. Murrey. The executive committee will consist of W. G. Oakman, J. C. Maben, Joseph Bryan, W. H. Goadby and R. B. VanCortlandt. The election of secretary was deferred.

A meeting of the Eastern Bar Iron Association was held in New York last week. The question of advancing prices was discussed and it was decided to make no change.

WESTINGHOUSE MOTORS FOR NEW YORK SUBWAY.

As recently announced, the motor equipment contract for the cars of the Interborough Rapid Transit Co., more popularly known as the New York Subway, was divided between the Westinghouse Electric & Mfg. Co. and the General Electric Co. The Subway company will operate two classes of train service. The first will consist of five-car local trains, composed of three motor cars and two trailers, making an average speed of approximately 16 miles an hour. The second will be eight-car express trains, comprising five motor cars and three trailers, making an average speed of 25 miles or more per hour. The same motors and gearing will be used for both classes of service. Each motor car will be equipped with two motors. These motors, known as "No. 86," are of the heavy railway type. They will be supported on the truck by "nose" suspension. The nominal capacity of the motor is 300 amperes at 570 volts, or 200 horsepower, for one hour. With this current and voltage a tractive effort of 4,150 pounds is developed at the periphery of a 33-inch wheel, at a speed of 19 miles per hour. Although designed for an average voltage of 570, the motor will operate satisfactorily with voltages up to 625. It will carry loads up to 500 amperes without injurious sparking.



WESTINGHOUSE MOTORS AND BALDWIN TRUCK.

The motor has a field frame of cast steel, divided into halves on the line of the centers of armature and axle, and completely surrounding the axle. The two halves of the field are held together by eight bolts and by removing these the top half of the field can be readily lifted off and access gained to the interior for inspection, repairs, or the removal of the armature or field coils. When the top field is removed the lower half remains suspended from the axle by stirrups which are permanently attached to the axle bearings. The four pole pieces are made of laminated steel punchings held between heavy end plates and secured by rivets. Each pole piece is bolted to the field frame by three bolts. These bolts do not pass through the pole pieces, but terminate in a long nut inside, thus affording a smooth unbroken surface. The field coils are made of copper strap wound on edge. All four coils are exactly alike in form and in number of turns.

The armature is 20 inches in diameter and weighs 1,930 pounds. It is of the slotted drum type and is composed of sheet steel punchings assembled on a cast iron spider. The three coils which rest in each armature slot are formed and insulated before being put in place. They are placed in the slots without bending or hammering and are carefully insulated from each other and from the core. Each conductor is continuous between commutator bars, giving minimum resistance and allowing effective insulation. The coils are held in the slots by wedges of special unshrinkable material which will withstand a high degree of heat without injury.

The commutator is composed of 159 rolled and hard drawn copper bars. These bars have solid necks raised above the surface of the commutator, with milled slots into which the armature bars are tightly soldered. The bars are mounted on a cast iron spider and held in place by two steel V-shape rings, one of which serves as an oil guard to thoroughly protect the mica from oil or grease. A low voltage between the commutator bars is secured, decreasing the liability of flashing from any cause. The bars are insulated from each other by sheets of mica of hardness that insures its wearing at the same rate as copper. The mica separating the bars from the rings is 1-16-inch thick, and the mica ring also separates the bars from the commutator spider. The wearing surface of the commutator is 16⅞ inches in diameter, and 9⅞ inches long. The bars are of a depth which allows a reduction in diameter of 2 inches.

The completed motor will stand an insulation test between winding and motor frame of 4,500 volts alternating momentarily or a test of 3,000 volts for one minute. The armature bearings are contained in housings which are securely held between the halves of the field frame, being tongued and grooved to the frame and securely doweled. At the pinion end the bearing is 4¼x10 inches, and at the commutator end 4x7 inches. These bearings are provided with drip grooves, into which oil is thrown by wiper rings on the shaft. The bearing boxes are of phosphor bronze, lined with babbitt metal well grooved for oil. The axle boxes are made to suit a 6½-inch axle and are 12 inches long.

Armature and axle bearings are lubricated by oil fed to the journals by waste, in accordance with standard railway practice. The oil boxes are formed so that the waste will pack itself against the journals. The oil box covers are lipped and hinged and fitted with springs that keep the lids tightly closed or hold them open as desired. Drip boxes are provided to catch all waste oil, so that no oil can get into the motor.

The gears are solid, of cast steel, with cut teeth. The diametral pitch is 2½ per inch, and the face is 5 inches. The pinions are forged steel with cut teeth. They are taper bored to fit the shaft and are held in place by a nut and lock washer. The diameter of the shaft at the large end of the taper is 4¾

inches. The gear case is made of malleable iron planed to a tight joint, with a suitable opening at top having a hinged cover. It is supported at the ends by horns cast on the motor frame and so shaped that they support the gear case without side strain. The total weight of motor, gear, gear case, etc., is about 6,600 pounds.

THE WILLS METHOD OF PRODUCING STEEL.

For several years founders have been awaiting a method by which steel suitable for castings may be produced in reasonable quantities. The ideal metal for this purpose should have a high tensile strength and sufficient ductility to stand bending, welding, riveting and other demands made upon high grade steel castings. The desire of the founder has been to secure a metal at a minimum cost which should be hot and fluid enough to run small work in green sand, as well as heavier castings.

We give herewith an illustration of a new converter patented by E. Cooper Wills, as it appears in the works of the Uniform Steel Co., Rahway, N. J. Castings are being made

THE WILLS PROCESS OF PRODUCING STEEL.

in the high grades of tool, machinery and low carbon steels as these are called for. The Wills converter consists of two sections working each independent of the other, a dome section, and a converter section which is formed by the ladles used for pouring the metal.

In operation the ladle is placed on a truck, and run under the dome section which in this case is stationary. The metal is run directly into the ladles from the cupolas through an opening in the dome section. When the ladle is full, this opening is closed and the metal skimmed through the opening left at the lip of the ladle. The tuyeres are placed on the side opposite to the lip of the ladle, connections being made with these through 6-inch pipes. Before blowing begins the openings are closed with sand mixed with a small portion of clay; but little of this is required, as the ladles and dome sections fit together tightly. From two to six pounds pressure of air is supplied.

A special flux is employed which, it is claimed, assists in removing the phosphorus and sulphur to be found in the metal. When the blow has been completed, the ladle is taken away, and another one run underneath the dome, two or more ladles being employed according to the amount of iron which is being melted. While the first is being poured, the second one is receiving treatment. Where small castings are being manufactured, the metal may be poured into small ladles for distribution to the different floors, no bottom pouring arrangement being necessary.

As shown in the illustration, the hood over the dome section leads directly into the cupola. A movable dome section may also be employed where this is deemed advisable. Among the advantages claimed for this process, is the small room taken up, and the fact that the ladle has as high a temperature as the steel which is being converted therein, causing the slag to come freely to the surface and giving a cleaner metal. In the first heat made in this converter there was produced a steel having .14 carbon, showing a tensile strength of 80,000 pounds per square inch without annealing. To show that the metal produced by the Wills process possesses a high initial temperature, it is stated that it has been held in the ladle for an hour and then poured successfully. It is also stated that the castings are remarkably free from shrinkage cracks and blow holes. It is intended to manufacture the Wills converter for the trade in the near future and the J. W. Paxson Co., of Philadelphia, have been made general sales agents.

Tariff Changes of the New Cuban Treaty.

The Cuban treaty ratified by the United States Senate March 19 provides that all merchandise produced by either country which now enters the other duty free shall continue free of import duties. All other Cuban products imported into the United States shall enter at a reduction of 20 percent from the rate of duty imposed by the United States on such articles of merchandise. All imports into Cuba from the United States, not entitled to free entry, shall be given a reduction of 20 percent, provided they do not fall within certain exceptions among which are the following:

Schedule A provides that the following articles shall be entitled to a 25 percent reduction from the regular tariff: Machinery and apparatus of copper or its alloys or machines and apparatus in which copper or its alloys enter as the component of chief value; cast iron, wrought iron and steel, and manufactures thereof; ships and water borne vessels of all kinds of iron or steel.

Schedule B gives a reduction of 30 percent on all articles of cutlery.

The Steel & Iron Corporation of Mexico has been incorporated under New Jersey laws with a capital of $1,000,000 common stock and $600,000 7 percent noncumulative preferred stock. This company is the successor of the Compania Industrial Mexicana, which was organized in 1887. It is said that Enrique C. Creel, who was identified with the Mexican company for some years, will be elected president of the new company. Later on it is intended to issue $500,000 6 percent first mortgage bonds, the proceeds of which are to be used in developing the property and for building a blast furnace. The mortgage is to be a first lien on all the present property and additions, including the blast furnace to be built. H. B. Seeley, of No. 11 Broadway, is interested in financing the new company.

St. Paul jobbers have been notified by the lake and rail lines that the opening rates on iron articles from the East to that city have been agreed upon. The rate on carload lots from Cleveland to St. Paul, lake and rail, will be 13½ cents per hundred pounds; from Pittsburg the carload rate will be 23 cents per hundredweight. In less than carloads the rate from Cleveland to St. Paul will be 18 cents, and from Pittsburg, 29 cents per hundred pounds.

The Lacey Buek Iron Co., Birmingham, Ala., has bought the Crudup mines (red ore) as well as the Oredell Iron Co.'s property (brown ore) at Oremont, Ga. Both properties have been in operation for a number of years, but the output of both will be doubled.

THE DE LAVAL STEAM TURBINE.*

BY CHARLES B. REARICK.

The paper was read from a pamphlet which he had prepared. It contained a number of illustrations of applications of the turbine, and also an appendix presenting extracts from a report of a test by Dean & Main of a 300-horsepower turbine, in May and June, 1902. The paper treated only of the typical form with motor shaft geared either to one or two driving shafts, which were the sources of motion to be transmitted, or which carried the dynamo, centrifugal pump or the impeller of the fan. The general design of the typical machine was discussed, so far as the fundamental principles of reducing the pressure of the steam by the diverging form of the nozzle, so that there should be no end thrust of importance upon the wheel and the pressure on the steam side and the exhaust side be essentially the same.

The construction of the turbine disc and buckets was explained in connection with their ability to withstand the strains introduced by centrifugal force at the high rotative speed which exists when the velocity of the bucket is one half that of the jet (47 percent of it when the jet is inclined). Reference was also made to the flexible shaft which is made necessary by any lack of balance in the construction of the disc, whereby the axis of rotation can always become the axis through the center of gravity of the disc.

The construction of the bearings for the high rotative speed, and the spiral gear for the reduction of the velocity were illustrated both by lantern slides and by actual constructions. The safeguards against possible accident in case of disruption, were also treated.

The limitation set by the capacity of any one nozzle, is removed by the use of several nozzles when the machine is required to do its maximum capacity, and the habit of closing off nozzles which are not required, and the structural method of attaining this end were exhibited. Reference was made to the necessity of having a different set of nozzles when the absolute steam pressure was different and particularly when the net difference between the steam pressure and the vacuum pressure was different, and the safeguard illustrated whereby any excessive speed could be made to operate a break-vacuum valve whose effect on the condensing turbine was to retard the rotation of the disc.

The author explained also the principle of the governor acting to throttle the supply of steam to the casing around the nozzles. He claimed a superior efficiency for his turbine over the reciprocating engine by reason of the absence of wear, and resulting leakage; by reason of the diminshed internal friction, particularly at all loads; by reason of the convenience attaching to the use of superheated steam and the absence of the inconveniences of oil for lubricating the motor when the exhaust steam was to be condensed and used over again. He spoke of the fact that the turbine compared rather with the compound condensing reciprocating engine than with the compound noncondensing. The rest of the paper referred principally to applications of the turbine to electric generators, and particularly to the convenience of operating alternators in parallel; to the use of the turbine to drive centrifugal pumps, and the preference to operate them in series when this was possible. Mr. Rearick presented also among his lantern slides, some views of the shops of the company at Trenton, N. J., and referred to the American as well as the French, English and German companies, as the off-shoots from the foreign Swedish organization.

In the discussion the author was asked as to the application of the turbine to operate the pumping equipment of an hydraulic elevator, and whether the rotating form of the machine could be automatically arranged to correspond to starting and stopping, as in the case of the reciprocating pump.

In answer to questions, Mr. Meden spoke concerning the reducing gears, by saying that after eight years of practical service there had been no particular effect observable due to wear and tear, and attributed this to the wide face of the gears. He stated that the loss in friction of bearings and in the gears, was figured at 4 percent. He stated further, in response to questions concerning the closeness of governing, that in street railway or other electric service, the turbine responded more quickly than the reciprocating engine. Where a turbine was run in series with a reciprocating engine, the close regulation had brought about a state of affairs in which the turbine was taking more than its proportion of the load, whenever a heavy load was on. This effect was attributable to the diminished masses to be affected in the two cases.

A member asked about the noise from the gears. The author answered that the noise from the turbine was transmitted through the air while the noise from the reciprocating engine was transmitted through solid parts of a structure. The consequence was that if the turbine was in a reasonably air-tight room in the basement of hotel or similar structure, it could scarcely be detected. In a plant which contained both a reciprocating engine and a turbine, the latter made more noise in the engine room, but in the fifth story the reciprocating engine could be heard and the turbine not at all.

A question was asked concerning the use of the vertical shaft, as a means to eliminate the necessity for the flexible construction used in the De Laval type. It was answered by the statement that while it had not been applied in the De Laval system, it could doubtless be done. In answer to the question whether the same turbine ran at the same speed noncondensing and condensing, it was explained that there was a difference of four inches diameter in the wheel selected for a 150 horsepower turbine, and about ten inches difference in the 300 horsepower.

The speaker called attention to a test with superheated steam, in which steam at 85 pounds gage pressure was heated to 932 degrees, and passed into the exhaust at 647 degrees or with 435 degrees utilized. The difficulty of securing complete expansion down the line of temperature, in a true gas in passing through a nozzle, was referred to in reply, while it was not difficult to secure complete expansion down the line of pressure. This circumstance made the question of a turbine for hot gas not so simple a proposition as it would appear to be, when the pressure question only was considered.

*Abstract of a paper read before the March meeting of the American Society of Mechanical Engineers, New York.

R. C. Stewart, Jr., and W. A. Stewart, proprietors of the Stewart Iron Works, Cincinnati, have commenced the erection of a large brick and steel building on their property, corner of 17th and Madison Ave., Covington, Ky., for their jail and prison business and their iron fence and specialty business. The present plant in Cincinnati will be improved and capacity largely increased and devoted exclusively to structural and architectural steel and iron work, bridges and viaducts. Their business has grown to such proportions that they will incorporate into three companies as follows: Stewart Iron Works Co., capital $300,000, devoted to the manufacture and sale of structural and architectural steel and iron work, bridges, viaducts, etc.; Stewart Mfg. Co., capital $175,000, devoted to the manufacture and sale of iron fence, lawn furniture and other specialties; Stewart Jail Works' Co., paid up capital stock $100,000, devoted to the manufacture and sale of jail and prison work, fire and burglar proof office and bank vaults, tanks, etc. The new plant will be operated by electricity. It will be ready for occupancy about July 1.

The creditors of the Anniston Rolling Mills, Anniston, Ala., have reached an agreement to dispose of the assets of the concern and pay off its indebtedness. Pay rolls outstanding will first be met dollar for dollar, and an effort will be made to resume operating the plant. The liabilities are placed at $40,000 and the assets at $32,000.

The *Post-Dispatch* of St. Louis credits John D. Rockefeller with the following: "I had ordered two castings, each 36 inches square and 10 inches thick, the first casting to be solid and the second to have a perforation through its middle. Well, the foundry clerk, through some error, billed both castings to me as though they were solid and when I pointed out the mistake sent me a credit slip. He had evidently, according to the slip, taken the dimensions of the hole in the second casting and calculated what the weight of a piece of iron of those dimensions would be. Then that weight, 432 pounds, he had put down as the weight of the hole and the credit slip he sent read: John D. Rockefeller, Cr. By one hole, weight 432 lbs. at 5c. $21.60. And that was the heaviest hole I have ever known."

GAS VALVE FOR OPEN-HEARTH FURNACES.

The construction and working of a patent gas valve introduced by Poetter & Co., of London, are described in an article in the London *Iron and Coal Trades Review*, from which we take the following:

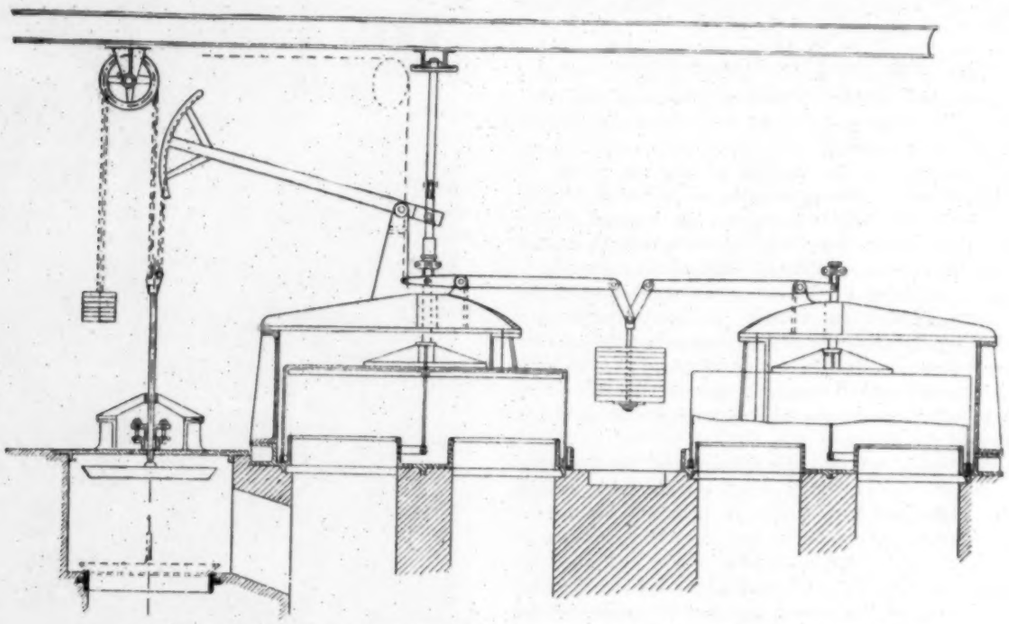
An open-hearth furnace of a charging capacity of 15 tons, having an average output of about 70 tons per day of 24 hours, will consume very nearly 30 percent or about 20 tons of coal. The gas valve during this period makes on an average seven reversals per hour, or in 24 hours 168 reversals, of say, 10 seconds each, being in all 1,680 seconds, or 28 minutes. The gas admission being thus in open connection with the flue and chimney during 28 minutes, and the gas finding no resistance as it does when passing the chequer work of fire bricks and the furnace proper, will escape under full pressure through the flue into the chimney; as a consequence the quantity of gas lost in 28 minutes—the time required for making the necessary reversals during a working period of 24 hours—will be at least twice as large as when in the ordinary way it is passing through the regenerators and the furnace.

It can be taken for granted that the escape of gas occasioned by the reversals during a period of 24 hours will at least equal the quantity regularly consumed in one hour; in other words, the quantity escaping will be as large as one-twenty-fourth of the whole gas consumption. Thus, at a furnace of 15 tons charging capacity there will be wasted by the reversals about 12½ cwt. of coal during a working period of 24 hours. This will mean, at a price of 12s. 6d. per ton for coal delivered free at the producer's gas plant, a loss of 7s. 10d. per furnace every 24 hours, or per year of 250 working days close upon £100. This amount, it is claimed, is the least which will be saved by the use of this gas valve. When the furnaces have a larger charging capacity than 15 tons, the consumption of coal, and consequently the amount saved, will be still larger.

The preceding calculation is verified, and in regard to the economy of coals, considerably surpassed by the figures shown in the following extract from the cost-book of a steel works. While the calculation given above shows an economy of coal of a little more than 4 percent, the cost book referred to shows an economy of more than 14 percent of the whole coal consumption.

The steel works in question, making ingots and steel castings, were working in 1900 with two furnaces, and in 1901 with one furnace, with a consequently higher percentage of coal consumption. In 1900 the average coal consumption amounted to 44 percent, rising in the first four months of 1901 to 54 percent. Since May, 1901, Messrs. Poetter's automatically stopping gas valve has been in use. As a result the average consumption of coal in the period from May to December was reduced to 40 percent, or, if the months of August and December, which had not been normal ones, are left out of consideration, to 37.66 percent. This means, in comparison with 1900, an economy of more than 14 percent. Moreover, since May, 1901, there was used coal and scrap of inferior quality, containing only 12 percent of first-class scrap, as compared with 17 percent in the coal used in 1900. But for this it is fair to assume that the economy of gas would have been still larger.

That the escape of gas is so surprisingly large, when reversing in the usual manner, is to be explained by the fact that when the gas admission is in connection with the furnace there is a pressure only equal to a 10 to 20 millimeters column of water in the pipe shortly before entering the valve, whereas, when during the reversals the gas admission is in connection with the flue, there is a vacuum of 50 to 60 millimeters. A further advantage claimed is that the life of this valve will be a good deal longer than the ordinary valve, inasmuch as the gas does not burn when passing through the valve, and any distortion of the coal is thereby avoided.



SECTIONAL VIEW SHOWING CONSTRUCTION AND WORKING OF POETTER'S AUTOMATIC GAS VALVE.

An interesting gas engine installation now operating in the plants of the Riter-Conley Mfg. Co., at Allegheny and Leetsdale, Pa., aggregates 1,600 h. p. in Westinghouse engines of the vertical single acting type. Three of them are 280 h. p. and are direct connected to polyphase generators arranged for parallel operation. These generators supply current for light and power in the new shops at Leetsdale. The remaining engines are employed for driving air compressors, pumps, etc. The gas engine is relied upon at both works for the entire power supply. Among other installations of a similar nature are: Pittsburg Screw & Bolt Co., 245 h. p. for generator driving—exclusive power supply; McClintick-Marshall Construction Co., Rankin, Pa., 585 h. p. for driving generator and compressors; Marshall Foundry Co., Pittsburg, 375 h. p. for generator driving; furnishes power for entire works. The machinery was furnished by Westinghouse, Church, Kerr & Co.

The Alabama Steel & Wire Co. has announced that one of the new blast furnaces it is building at Gadsden will be in operation this summer or several months earlier than at first expected.

HEAVY STEAM-DRIVEN VEHICLES.*

BY RALPH L. MORGAN, WORCESTER, MASS.

From the first, in experiments with motor wagons for heavy freight, steam has been the favored power. The gas engine has received some attention in France and Germany, and considerable time and money have been spent in this country in the development of the electrical machine. The most successful power trucks made anywhere are steam driven. It is to the English builder and during the last six years, that we owe the greatest progress. While road locomotion has been before engineers for a century, it is only since 1896 that any really practical results have been obtained. The English merchant and the manufacturer have been more willing than the American to make trial of machines which promised well, and to give financial encouragement to builders and in the organization of competitive trial. The American seems too often to prefer to wait a year after someone else has made the trial.

The Liverpool Self-Propelled Traffic Association was formed in 1895, and organized the first set of trials in 1898. Among the first efforts, properly called successful, was a three-ton lorry, built by T. Coulthard & Co. This was in use in 1896, but at the trials of 1898 great improvements were already manifest. At this competition, four machines started, representing three builders. A two-ton vehicle, made by the Liquid Fuel Engineering Co., known as the "Lifu," received second prize, making the pace each day showing twice the mileage of the others and going through the four days' trial with but ten minutes repairs on the road.

The Leyland lorry, which received the first prize, showed the greatest advantage in cost of operation and haulage per ton mile. It is generally understood that other things being equal, the vehicle of the greatest carrying capacity can be operated at the least cost per ton of goods carried. The Leyland machine had the boiler in front, with a small vertical engine in the cab and a condenser on the roof. The Thornycroft machine has been greatly improved since the 1898 trials. Their machine of that day seems to have been the first effort to use metallic wheels. Their other machine, with a capacity of five tons, on six wheels, proved quite impracticable.

This same association in 1901, made another series of trials which were considered as so successful that no further trials were necessary. Three manufacturers presented satisfactory steam machines and one a good gasoline truck. This last proved reliable, so far as it went, but its scope was narrow. Concerning electrical machines, the report of the trial says, "The non-participation of vehicles using accumulators, confirms the view, that this method of propulsion is unsuitable for goods traffic on common roads, and only a reduction of weight combined with increased periods of efficiency will alter them." The Milnes gasolene lorry, and the Coulthard, Leyland and Thornycroft steam trucks received prizes.

The particular features of the Thornycroft four-ton lorry, are the use of a live axle, the driving of the wheel through leafsprings, rigidly on the axle, to the felloe of the wheel, without cross-strain on the spokes; the central firing of the boiler through a flue, from above, which can be used as a means of checking the fire, and the horizontal arrangement of the engine with a two-speed adjustment, so that gears of 9 to 1 and 20 to 1, can be secured. The gears are exposed, which may do very well in England but would not be acceptable here. The Thornycroft boiler, is a water-tube design, so made that the steam dome can be reached by removing the upper cover plate and the mud-drum plate gives similar free access to that part of the boiler. With these plates removed, the inside of the tubes can be conveniently cleaned. In the larger compound engines the design is entirely inclosed, and with a separating space between the cylinder head and the crank case. The stuffing-boxes can be reached for packing through an opening, and leakage from the engine cannot get into the crank case.

In the Coulthard five-ton lorry, the boiler is provided with a small opening in the side of the fire-box for igniting the fire and for the use of the poking bar, but their main dependence is on the jarring of the vehicle to shake the ashes from the fire into the ash-pan. The ash-pan can be dropped easily and the grates in turn, so that the fire can be dropped upon the ground in a very short space of time. The boiler provides a construction by which the top and the outside shell can be entirely removed if desired. The Coulthard engine is compound, with its high-pressure valve taking steam in the center. On the discharge of the steam from the high-pressure cylinder, it is carried through a valve, termed the "multiplying valve" into the receiver, which is a part of the common cylinder-head for both cylinders. This multiplying valve is so constructed that steam can be bled into the low-pressure cylinder. The engine is hung from three points of support, the bearings on the main frame being spherical, so that as the vehicle may twist, the strain is not transmitted to the engine, nor borne upon the shafts. There are no keys in this engine but where they would naturally be used, the shaft is made square.

The Leyland machine closely resembles the Coulthard and is thought by many to be the best machine in England today. The boiler is in front and ahead of the front axle. The engine is horizontal, under the frame of the truck. The condenser seems to have been dropped from the modern designs. The machines represented in the illustrations, use solid fuel with the exception of the design of the Liquid Fuel Co., which uses kerosene. The White steam wagon of Cleveland, uses coke. Its form of wheel is the result of the necessity for going up the steep grade of the levee at an angle. Mr. Herschmann's express truck, uses coal, and has a carrying capacity of five tons. This was described and illustrated in *The Iron Trade Review* of July 3, 1902. The Morgan truck illustrated and described in *The Iron Trade Review* of Dec. 25, 1902, has a capacity of ten tons.

Mr. Morgan presented slides of the boiler, engine and running gear of the Morgan truck. He described his wheel with steel spokes and a cast iron rim cast around the spokes in place and allowed to cool before the hub is cast. Outside of the cast iron rim, when finished, is put on an oak felloe and outside of that a steel rim. Opposite each of the spokes is a tire bolt, and these 24 tire bolts can be used to fasten diagonal road strips for winter use. The sprocket for the driving axle is inside the bearing, which brings the chain wheel under the vehicle and out of the dirt, and while it necessitates driving through the spokes, the construction of the wheel makes this of no consequence. The axle runs right through from one wheel to the other, but one carries a sleeve or quill, by which the differential action is secured. The machine carries two capstans and a crane, for loading and other uses.

Mr. Morgan presented also some detail of methods which have been elaborated to secure rapid loading of the heavy truck both by movable bodies and by mechanical handling of large masses.

At the close of the paper Fred L. Stearns, present by invitation, on behalf of the Department of Street Cleaning of New York and its commissioner, John McG. Woodbury, gave some description of the problem of loading and discharging refuse collected in the city and to be delivered to dumps on the water front. The haul was often one and three-quarter miles. City horses are not allowed to trot by reason of the injury from the pavement. The commissioner estimated that two horses worth $3 a day, and two men at $4 a day, and use of the truck 80 cents, or $7.80 per day; five loads weighing two and a half tons, carried one and three-quarter miles, makes a total of twelve and a half tons moved seventeen and a half miles, or a cost of 62 2-5 cents a ton.

The dumps have a runway from the water front level with a rise of ten feet in seventy or in one hundred and twenty feet. It would be unsafe to make the loads heavier than two and a half tons. Lantern slides were presented showing the standard carts and dumps. The small capacity one horse cart, with one and a half yards, or one ton capacity, and the two horse truck of three and a half yards or two and half tons, were exhibited as well as the light refuse cart with a capacity between four and eight yards, carrying about one hundred pounds. The set of slides included also the sweeping machine for which a motor would be a great convenience, and a motor-driven compressed-air washing wagon.

At the close of this presentation Warren S. Johnson pre-

*Abstract of a paper read at the monthly meeting of the American Society of Mechanical Engineers, New York.

sented photographs of a 3,500-pound wagon which would take a 6,000-pound load. The motor was inclosed in a box attached to the forward axle of the wagon, since in the opinion of its designer, by so doing, several objections were avoided which attached to the rear-axle driving method. In driving from the front axle, the movements of the horse-driven vehicle were more nearly reproduced. With the rear-drive the whole load has to be moved in backing and bringing the tail of the vehicle to the sidewalk. The horse, by turning sidewise, turns half the load at a time, and the system requires less room, particularly if it is to be handled in an alley or narrow street. The wagon illustrated, twelve feet in length, can be handled in a 17-foot street. It is a steam machine using gasoline as a fuel, costing $12.00 a month.

In answer to questions, Mr. Morgan stated that the dead weight of his machine was between 75 and 90 percent. of the weight that it would carry as live load. Mr. Herschmann of the Adams Express Co. commented upon the desirability of strong construction and that the saving of possible weight and economy in operation would be more than offset by the first break-down resulting from the construction being too light. He spoke also of the practice in Liverpool, Maiden Head, Manchester, and a number of London districts, in operating motor, rubbish and refuse wagons, but that in every case the weights were much greater than those mentioned by Mr. Stearns. Mr. Herschmann spoke also of the problem of propulsion by four wheels and the difficulty of steering. If the rear wheels are used in steering there are difficulties met when the wagon is close to a curb.

Mr. Thorpe spoke in detail of the War Office trials in England and of the use of Thornycroft vehicles in the recent war in South Africa.

INDUSTRIAL SUMMARY.

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New Buyers in the Market and Some of their Wants:—

The Butler Street Foundry & Iron Co., Chicago, has increased its capital from $25,000 to $75,000.

The Fraser-Mather Co., Milwaukee, has been incorporated with a capital of $30,000 to manufacture electrical machinery.

The Brown-Ketcham Iron Works, Indianapolis, will increase its common stock to $200,000 and its preferred stock to $250,000.

The New England Steel Co. has been organized at Augusta, Me., to deal in metal castings. The capital stock is $1,000,000 and the promoters are: Eugene Edwards, George M. Randall, Malden Mass.; W. W. Montgomery, Newton, Mass.; Frank L. Dutton, Charles L. Andrews, Augusta. Eugene Edwards is president and treasurer.

The Watelsky Iron & Metal Co., Cincinnati, has been incorporated with a capital of $10,000. The incorporators are Toledo men, engaged in the scrap iron business, and will operate in Cincinnati in conjunction with the Toledo property of the incorporators.

St. Mark's Wheel & Spoke Co., New York, has been incorporated with a capital of $250,000.

The capital stock of the Latta & Martin Pump Co., Hickory, N. C., has been increased from $24,000 to $50,000.

The Universal Machine Development Co., a New York City concern, has been incorporated under the laws of Delaware with a capital of $300,000 to deal in patents and trade marks and to operate manufacturing plants.

The American Tool & Machinery Co., Philadelphia, has been incorporated with a capital of $125,000 to manufacture tools and machinery.

The Aurora Foundry & Machine Co., Aurora, Mo., has been incorporated with a capital of $75,000.

The Richards Machine Co., Atlanta, Ga., has been chartered with a capital of $10,000 to deal in all kinds of machinery and tools.

The National Steel Grave Vault Co., Cleveland, has been incorporated under the laws of Delaware to construct grave vaults. Capital $200,000.

The Granger Lock & Hinge Co., Ltd., with a capital of $110,000, of which $60,000 is paid in, has been incorporated at Grand Rapids, Mich. The company will manufacture locks and hinges of all kinds as well as brass novelties. The board of managers consists of A. M. Granger, president; James Stewart, treasurer and general manager; Eustis W. Tower, secretary.

The Combination Metal Co., Washington, D. C., has been organized for the purpose of carrying on the business of fixing, manufacturing and marketing any articles manufactured from metal. Capital $20,000. The incorporators are: Charles W. Embery, James A. Black and Virgil M. Fookes.

The Akers Steering Gear Co., Chicago, has been incorporated with a capital of $25,000 to manufacture machinery and castings. Incorporators: W. A. Page, Wm. S. Cumming, E. C. Akers.

The Michigan Malleable Iron Works, Detroit, which only recently doubled its capital, has decided to increase it from $300,000 to $600,000, of which $100,000 was subscribed in cash and $200,000 was a stock dividend.

The Waynesburg Pressed Steel Co., capital $100,000, has been organized at Waynesburg, Pa.

The Somerset Pump Co., Somerset, Pa., has been incorporated with a capital of $20,000.

The Cambridge-Byersville Steel Co., Cambridge, O., has been incorporated to manufacture and deal in steel and other metals; capital $100,000; incorporators, C. L. Bailey, Marietta; J. E. Schlieper, Pittsburg; A. A. Taylor, John S. Black, Lakin C. Taylor, Cambridge.

The Milwaukee Machine Co., Milwaukee, Wis., has changed its name to the Milwaukee Machine Tool Co. and increased its capital stock from $50,000 to $100,000.

The Advance Furnace Co. of America, Niagara Falls, N. Y., has been incorporated with a capital of $100,000. The incorporators and directors are Edward L. Wells, Philip Owen, Charles H. Childs, Everett F. Crumb and Frank S. Schrader of Utica, N. Y.

The East Biwabik Iron Co., Duluth, Minn., has been incorporated with a capital of $75,000 for the mining of iron ore. The incorporators are Fred H. Merritt, Albert C. Hubbell and Thos. A. Merritt.

The Moline Tool Co., Moline, Ill., has been incorporated with a capital of $12,500. This company is already engaged in business and is building a new plant.

A new company is being organized to manufacture steel rope cordage at Tonawanda, N. Y. The directors of the new company will be: President, W. Patterson of Pittsburg, Pa.; secretary, R. Palmer of Buffalo; treasurer, E. J. Rankine of Niagara Falls; trustees, C. W. Goodyear, Buffalo; H. Rider, Boston; G. Laverack, Buffalo; C. Arcoff, Buffalo.

The Carberry Machine & Mfg. Co. Ltd., has been incorporated with a capital of $100,000 at Carberry, Manitoba. It is understood that the company will purchase the machine works of another concern in Carberry.

The Harrisburg Boiler, Supply & Repair Works Co., Harrisburg, Pa., has been chartered to manufacture boilers, engines, machinery, tools, supplies and equipment, and to buy, sell and repair such articles, and to buy and sell metal scrap. The company is capitalized at $5,000.

Price & Chick, 204 Commerce St. S. W., Roanoke, Va., want vertical boiler about fifteen or twenty horsepower.

Thompson, Son & Co., 114 Liberty St., New York, want two 125-150-horsepower horizontal tubular boilers, second-hand; steam pressure 100 pounds or over.

A. J. Baldwin & Co., Dawson, Ga., are in the market for a second-hand engine lathe, 16-inch swing.

Baker, Stillwell & Hart, Birmingham, Ala., will buy a shear to shear up to 2x16 inches; second-hand preferred.

Katzenberger Keyless Lock Co., San Antonio, Tex., wants small milling machine, emery grinder and forge.

Baker, Stillwell & Hart, Birmingham, Ala., are in the market for 10-horsepower traction engine, second-hand.

Fires and Accidents:—

The plant of the Flint-Lomax Electric & Mfg. Co., Denver, was recently damaged by fire to the extent of nearly $50,000. A large number of valuable machines were rendered useless by fire and water. The plant will be rebuilt.

The plant at Jenison, Mich., of the Jenison Iron & Steel

Shops, Jenison and Grand Rapids, was destroyed by fire March 21; loss, $50,000; fully covered by insurance.

New Construction:

Extensive improvements are contemplated by the officials of the Indiana Bridge Co., Muncie, Ind. The business of the company has been growing so rapidly that the present plant is unable to accomplish the work on hand, although for months employes have been working night and day. The plans for the additions have not been made but will be completed soon. When the new plant is completed more attention will be devoted to structural work.

The Mitchell Mfg. Co., Portsmouth, O., contemplates erecting a foundry as an addition to its plant.

The Jarvis Adams Foundry Co., McKees Rocks, Pa., has had plans prepared for a foundry building. Several smaller buildings will be erected.

The contract has been awarded for the erection of the first building of the plant of the Standard Motive Power Co., at Canal Dover, O.

The Missouri, Kansas & Texas Railroad has decided to make large additions to its shops at Parsons, Kan.

Bartley C. Reuter is erecting a two-story machine shop at Taylor and Wallace Sts., Philadelphia. It will be 51x38 feet, and will cost $10,000.

W. P. Anderson, who was formerly interested in the Sedro Wooley Iron Works, Sedro Wooley, Wash., and others, have formed a company for the purpose of building a foundry in that city.

The Winton Motor Carriage Co., Cleveland, will make its plant the largest automobile factory in the world. Plans have been prepared which, when carried out, will give the Winton plant a floor space of more than 500,000 square feet. The present output is seven finished automobiles a day. The additions will make the entire output twenty-one machines per day.

Excellent progress is being made in the improvements to the Sylvan Steel Works, of the Republic Iron & Steel Co., at Moline, Ill. The cost will be about $60,000.

The Mansfield Engineering Co., Mansfield, O., has let the contract for an addition 169x75 feet.

The Decatur Bridge Co., Decatur, Ill., which has just placed in operation its large new machine shop, has purchased additional ground and contemplates making further extensions to the plant.

Ground has been broken for the building of the large plant of the Rock Island R. R. at Moline, Ill. The machine shop will be the first of the group of buildings to be erected.

The Dominion Iron & Steel Co., Sydney, Canada, has asked for bids for the rebuilding of its coal washing plant, recently destroyed by fire.

The Manitoba Iron Works Co., Winnipeg, Man., has called for bids for the following buildings: Pattern shop 30x40, forging shop 40x40, boiler room 25x21, engine room 16x25, with bath rooms and lavatories 15x18, clipping room 16x18, core room 16x31, cupola room 16x10, boiler manufacturing shop 40x60, and machine shop 60x125.

Work will soon be commenced on the improvements to be made at Pocatello, Idaho, by the Oregon Short Line. Car shops and a foundry are to be erected.

The Titusville Iron Co., Titusville, Pa., has completed its boiler shop, which is probably the largest in the country, measuring 421x200 feet.

The Stacey Mfg. Co., manufacturer of gas holders, water and oil tanks, bridges, architectural iron work, coke crushers, etc., now located on Mill St., Cincinnati, will build a plant at Elmwood Place, near Cincinnati, which will consist of a machine shop 130x500 feet, foundry 90x200 feet pattern shop 30x60 feet. The buildings will be constructed of brick and iron, with slate roofs, and will be fire proof. The north and south ends of the machine shop will be two stories, the rest of the building one story.

J. R. Cross, Mansfield, O., is general manager of a corporation organized for the erection at Owensboro, Ky., of a brick, iron and steel factory building, 75x150 feet, for the manufacture of buggy irons. It will have engine and boilers, shafting, pulleys, machinery and metal roof.

The Singer Mfg. Co. will enlarge its plant at South Bend, Ind., by the erection of a four-story brick building, 400x60, to be equipped with elevators, electric lighting system, etc. In addition the foundry warehouse will be extended 200x80 feet and other improvements will be made to the various buildings. Leighton Pine, western manager.

The George H. Merrit Co., of Sag Harbor, N. Y., with offices in the St. James Building, 1133 Broadway, New York, has purchased the business carried on for many years by John Fordham, of Sag Harbor, in the manufacture of eel and fish spears, clam rakes and shark hooks. This company contemplates improving its present holdings by the erection of a two-story brick building and installing modern machinery. It is extensively engaged in the manufacture of machinery and tools. Proposed additions will increase the output 50 percent.

The Detroit Automatic Stoker Co., Detroit, is building a new plant, which has been made necessary by the growth of its business. The new plant will occupy about one and three-quarters acres. The foundry will be 184x185 feet, and the finishing department 150x72 feet. The company expects to be in its new quarters about May 1.

The Herron-Brady Pump & Foundry Co., Chattanooga, Tenn., recently incorporated with a capital of $100,000, has the buildings under way for the manufacture of steam pumps, gate valves and fire hydrants. The machine shop building will be 150 feet long and two stories high. In the second story there will be two galleries, one on either side, 22½ by 150 feet. There will be a traveling crane traveling full length of building. These buildings will be equipped with the most modern tools. In connection with machine shop the company is building a foundry 150x100 feet, cupola and core ovens being on the outside of main buildings. Pattern house will be a separate building away from the main buildings, and the office building will also be separate. The buildings when completed will cost about $60,000. The company expects to be running in all departments by June 15. It already has several nice orders on its books. The officers of this company are: Charles Herron, president; J. Brady, vice president and manager; P. J. Crimmins, secretary and treasurer. Among the stockholders in this company are some of the largest iron masters in the South.

Improvements which will nearly double the capacity of the plant are being made to the blast furnace of the Pacific Steel Co., Irondale, Wash. The company also proposes to erect a new furnace.

The Western Electric Co., Chicago, has purchased 109 acres on the West Side, Chicago, along the Chicago, Burlington & Quincy tracks, for $218,000, and will erect an extensive plant which will cost over $1,000,000. A large machine shop and foundry will be built along the belt line tracks.

The recent increase of capital stock of the Russel Wheel & Foundry Co., Detroit, from $275,000 to $350,000 was on account of decided increases to the plant, both in the way of additions to buildings and machinery in the past six months. With such additions the company has increased capacity in the way of manufacture of at least 50 percent above its output of last year, which output was the largest in the history of the company. Orders already in hand assure a prosperous business for the year 1903.

The Pittsburg District:—

The Pittsburg Filter Mfg. Co., of Pittsburg, Pa., has applied for a Pennsylvania charter and will shortly be incorporated with a capital of $150,000. This concern has been operating in Pittsburg for the past three years and has enjoyed a healthy growth. During that time it has installed a large number of water softening plants not only for industrial plants throughout the country, but for water works in many large cities as well. Several months ago it completed the largest water softening plant ever installed by a manufacturing concern for the Tennessee Coal, Iron & Railroad Co., at Ensley, Ala. The incorporators are: J. B. Greer, E. S. Buchan, O. W. Rafferty, F. W. Severance and S. Severance, Jr. After April 1 the offices of the company will be located in the Farmers' Bank Building.

On Friday evening, March 27, the Pittsburg Railway Club will hold its monthly meeting at the Hotel Henry. E. W.

Summers, of Youngstown, O., will present a paper entitled "Steel Cars Without Center Sills." In the afternoon of the same day the members of the club will visit the plant of the Pressed Steel Car Co., at McKees Rocks, Pa.

At a meeting of the stockholders of the Brady's Bend Fire Brick Co., of Brady's Bend, Pa., held at Pittsburg last week, a permanent organization was effected by the election of A. P. Weidman as president; Isaac Kaufman, vice president; Edward W. Dewey, secretary, and Morris D. Kaufman, treasurer. Contracts for the buildings and machinery will shortly be awarded by Victor Beutner, who designed the plant. The capital stock of the company was increased at this meeting to $100,000.

At the regular monthly meeting of the Engineers' Society of Western Pennsylvania, held at Pittsburg, on Tuesday evening, March 17, the subject under discussion was concrete and its various uses in latter day engineering practice. Armin Schotte read a paper on the manufacture of cement and gave much interesting matter on the first principles of concrete mixtures. A large number of applicants were admitted to membership and at the present rate there is every indication that before the end of the year the society's membership will number fully one thousand.

General Industrial Notes:—

J. C. Davies has purchased the interests of Dewitt T. Wood in the Camden Water Wheel Works, Camden, N. Y., of which the owners are now W. G. Percival, Isaac D. West and J. C. Davies.

The Toledo Castings Co., Toledo, O., expects to begin operations April 1st. The company will start with 40 or 50 employes and the product will be railroad supplies.

At the annual meeting of the Detroit Foundry and Manufacturing Co., Detroit, the following board of directors were elected: J. W. Thompson, Alex McPherson, F. L. Bromley, N. D. Carpenter, Walter Thompson, Charles F. Lawson, all of Detroit, and Geo. E. Bardeen of Otsego, Mich. The officers elected were: F. L. Bromley, president; J. W. Thompson, vice president; C. F. Lawson, secretary and treasurer. This company is soon to move into its new plant on the boulevard near Russell St.

The Whale Creek Iron Works, recently incorporated at Brooklyn, N. Y., was organized to manufacture ornamental iron work for buildings, including wrought or cast iron, also bronze or brass. A plant has been leased for temporary use, but an entirely new plant will be erected. The officers of the company are as follows: Andrew N. Petersen, president; Herman Behrens, secretary, a practical man in this line of work; Waldemar Jansen, treasurer, who had years of experience with the Hecla Iron Works, of New York, and Winslow Bros., of Chicago. The company has on hand contracts for the ornamental iron work for three hotels in New York City.

The Steel Wheel & Wagon Co., Pueblo, Col., organized in 1901, has recently turned out its first all steel wagon, which was made for J. C. Osgood, of the Colorado Fuel & Iron Co. The main building of the plant is 300x96 feet. The company is said to be the only one in existence which manufactures wagons entirely of steel.

The recently organized Hillsdale Wheel Co., Hillsdale, Mich., started its plant a few days ago. The new officers are C. F. Cook, president; M. E. Hall, vice president; George F. Gardner, secretary and treasurer; E. J. Watkins, superintendent.

It has been the custom towards the end of the manufacturing season to close the foundries of the Warder, Bushnell & Glessner Co., Springfield, O., for from one to four months. Announcement is now made that both the main and branch malleable foundries will continue in operation practically without cessation for the entire year.

The furnace recently put in blast by the Lackawanna Steel Co., Buffalo, is shipping four carloads of Bessemer pig iron to Eastern markets daily.

J. Winstanley, V. Adams and A. Winstanley, as the Oshkosh Machine Co., have opened a machine shop at Oshkosh, Wis.

The Lebanon Valley Iron Co. has completed and is operating four of its new puddle furnaces at its East Lebanon plant. The other four furnaces will be finished and ready for operation within a month or so. The 7-inch mill will be completed by the first of June.

The plant of the American Machine & Foundry Co., Kingston, Pa., has been purchased by the Scranton Steam Pump Co., and hereafter it will be conducted as the Wyoming Valley branch of the Scranton company. Extensive improvements are to be made at the Kingston plant. To the Scranton plant is being added a new foundry building 120x160 feet. The company is an extensive manufacturer of pumps.

The Fulton Engine Works, Los Angeles, Cal., has just shipped to the Lick Observatory on Mt. Hamilton the new mounting for the famous Crossley reflecting telescope, which became the property of the observatory in 1895, by gift from Edward Crossley, of Halifax, England. The Fulton Engine Works has spent about eight months building the mountings, which cost about $4,000.

The Eddystone Mfg. Co., Eddystone, Pa., recently awarded three prizes of $50, $30 and $20 to workmen for suggestions for the improvement of machinery of the plant. These prizes are awarded yearly and all employes of the company are entitled to participate.

The Hammond Iron Works, Warren, Pa., have secured a $250,000 order from the United Coke & Gas Co., of New York. The contract calls for the erection of a plant for the manufacture of coke and gas and of the by products.

The Eastern Iron Co., incorporated last November, will shortly begin operating the blast furnace in Secaucus, N. J., which has been idle since 1893. The plant has been reconstructed and modernized and will be ready to be blown in about May 1. Its product will be foundry iron. The company obtains its ores from mines recently bought of the Kearney Iron & Mining Co., comprising 250 acres of red hematite iron ore lands near Gouverneur, N. Y. The mines have a daily capacity of 400 tons of ore. The capital stock of the Eastern Iron Co. is $600,000. The officers are: President, Charles Andrews; vice president, Frederick Crane; secretary, S. L. Mershon; treasurer, J. M. Clark. The general manager is Albert Trinler, formerly manager of the National Steel Co.'s furnace at Sharon, Pa. The plant is situated in a large manufacturing center which draws practically all of its present supplies from a distance.

The Western Stove Manufacturers' Association has recommended an increase of 5 percent in the price of stoves, which it is understood will be generally ratified by manufacturers. The increase in the cost of material is given as the reason for this advance.

The Scott foundry department of the Reading Iron Co., Reading, Pa., has closed a contract with the trustees of the Brown wire gun for the building of a gun and mount according to their plans. The money for this gun was allotted by the board of ordnance and fortification and approved by the secretary of war. If this new gun meets the expectations of the trustees many more will be made.

Patent Devices for Universal Mill.

Charles L. Huston, vice president of the Lukens Iron & Steel Co., Coatesville, Pa., has been granted recently the third of a series of patents on improvements in a universal plate mill. These are embodied in the three-high universal plate mill in operation in the Lukens plant. The first was granted Aug. 7, 1900, and is on a roll-relieving device. Two wedges are mounted on plates above the housing boxes of the upper roll. Screw rods passing through the wedges, when turned in one direction, draw the wedges together, and when turned in the opposite direction separate the wedges, thus relieving the rolls. The second patent, granted Sept. 11, 1900, provided a special pull-back device for the vertical rolls, an adjusting mechanism being devised to take up lost motion. The last patent, granted March 3, 1903, makes further improvements in the construction of a three-high universal mill, first, by providing bracket guides or tables to support the material between the roller tables and the middle roll. It also covers an arrangement of the upper bearings for the vertical rolls, so that these may be readily removed without dismantling the mill to any great extent. A third feature is the provision of a suitable step bearing for the vertical rolls.